THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD, THE BRASS FOUNDER AND FINISHER AND ELECTRO-PLATERS REVIEW
A TRADE JOURNAL RELATING TO THE NON-FERROUS METALS AND ALLOYS.

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VANADIUM AND ITS EFFECT ON STEEL AND COPPER ALLOYS.

The following article has been prepared by N. A. Helouis, the great French metallurgist, who is probably the leading expert in the world in the use of vanadium and its alloys. Vanadium does not readily enter into combination with other metals, and its union with copper and the bronzes has been found to be very difficult, although the proportion demanded for the best results has only been about ¼ of 1 per cent. The effect produced by the introduction of vanadium and its influence upon other metals is presented in the following essay, which we are permitted to present through the courtesy of the Vanadium Alloys Company, of 25 Broad street, New York City:

The remarkable properties of vanadium insure for this metal one of the foremost places in the industries. The practical applications of the past few years, although made with products of very inferior quality, have shown that vanadium is undoubtedly the metal of the future.

The first thorough investigation of its properties was made only twelve years ago. In 1896 N. A. Helouis submitted his first communication concerning the commercial and industrial applications of vanadium to the "Societe d'Encouragement pour l'Industrie Nationale" (Society for Encouraging National Industry).

Since that time the industrial interests, whose attention was attracted by the properties of the new metal, have largely advanced the practical utilization of vanadium. Their investigations, however, were poorly managed, and the results obtained were sometimes far from conclusive, inasmuch as the products placed at the disposal of the manufacturers were not pure. As a result of the processes discovered by Mr. Helouis, industrial consumers are at present in a position to obtain absolutely pure products.

The applications of vanadium are manifold, and among them we may mention:

Its application to therapeutics and to the extensive chemical industry. It is used for dyeing with aniline black, in ceramics for high temperature firing; in the manufacture of anhydrous acids, fuming sulphuric acid, etc., etc., for electrical batteries, etc. The most important of all, however, is its application to metallurgical purposes, such as the preparation of steel, bronze, aluminum, silver, gold and platinum.

METALLURGY OF STEEL.

The following products are now being manufactured:

1. Hard ferro-vanadium for steel.
2. Cupro-vanadium for bronze and telephone wires.
3. Ferro-nickel-vanadium for special grades of steel.
4. Ferro-chrome-vanadium for special grades of steel.
5. Ferro-tungsten-vanadium for special grades of steel.
6. Pure chromium and tungsten.
7. Aluminum-vanadium of great strength for bicycles.
8. Nickel-vanadium ("platinoid") for manufacturing jewelry and for making laboratory apparatus, which is not attacked by acids and adapted for replacing platinum apparatus.

The qualities which vanadium imparts to steel are exceedingly important, but if the maximum advantages are to be obtained, it becomes necessary to use only pure products, free from all ingredients which may interfere with the purpose of obtaining the essential qualities which only pure ferro-vanadium is able to impart to steel, and more especially to special grades of steel, possessing most remarkable properties. The ferro-vanadium supplies to the metallurgical industry at the present time contains, however, substances which have a deleterious effect on the quality of the steel in which it is used, and these grades of poorly manufactured ferro-vanadium tend to discredit the use of vanadium. Although they increase the breaking load and the elastic limit, having in this respect an effect like carbon, they do not allow the steel to retain its normal elongation, but decrease it very considerably. On the other hand, the ferro-vanadium manufactured by Mr. Helouis possesses the distinctive property of increasing the breaking load and the elastic limit without diminishing the elongation. Vanadium steel made with these latter products shows a complete absence of brittleness, and specimens can be shown to interested parties.

	Strength per sq. millimetre.	Elasticity per sq. millimetre.	Elongation.
Steel No. 1:			
Natural	70	58	21
Tempered	121	102	7.9
Steel No. 2:			
Natural	95	65	44
Tempered	85	46	88
Steel No. 3 (*A*):			
Tempered at 850....	151	137	4.2
Steel No. 3 (*B*):			
Annealed at 300....	146	132	65
Steel No. 3 (*C*):			
Annealed at 400....	132	120	9
Steel No. 3 (*D*):			
Annealed at 500....	118	99	12
Steel No. 3 (*E*):			
Annealed at 600....	106	87	16
Steel No. 3 (*F*):			
Annealed at 800....	81	52	27

This brief table shows the great strength which

vanadium imparts to steel, and explains why the great metallurgical interests are so eager to find pure products for their consumption.

VANADIUM BRONZES.

No. 1.—Vanadium bronze for lathe pinions.

	Strength.	Elongation.
Natural	72	15
Tempered	45	75

No. 2.—Vanadium bronze for automobile gear wheels with unbreakable teeth and for weatherproof automobile axle bearings.

Strength.	Elongation.
80	22

No. 3.—Semi-hard bronze for automobile parts, parts of cars and carriages, piston rings, etc., weatherproof.

Strength.	Elongation.
65	35

No. 4.—Art bronze, weatherproof, for statues, Paris specialties, novelties, plates, clock strikes, mantel clocks, etc., making exceedingly fine casts, and very resistant to blows and shocks.

Strength.	Elongation.
53	32

No. 5.—Vanadium bronze or telephone wires.

Strength.	Elongation.	Conductivity.
80-85	25	93-95

VANADIUM-NICKEL (PLATINOID).

This exceedingly ductile and malleable product is only very slightly attacked by diluted acids and remains unchanged under the influence of air and sea water. It can be rolled into extremely thin sheets. When platinated (Helouis process) it can be used instead of pure platinum. This platinated metal is destined to have a very great future.

NOTES ON WELDING COPPER, BRASS AND BRONZE WITH THE OXY-ACETYLENE BLOW-PIPE.

The principal application of the oxy-acetylene blow-pipe is for welding iron and steel; but, copper, brass and bronze can often be welded advantageously by this process.

The welding of copper piping by the "Epurite" process instead of brazing is coming into vogue; numerous explosions have been caused by the slow disintegration of the brazing under the influence of the voltaic elements formed by the presence of zinc and copper. The zinc is dissolved gradually by the inorganic acids by water and by the organic acids which obtain in the piping. The brazing is transformed into a copper sponge which is absolutely non-resistant.

In welding copper wires the tensile strength obtained is never higher than two-thirds of the original strength; curiously enough, the wire breaks near the weld, but never at the weld itself. Brass can easily be welded by using borax as a flux.

The acetylene blow-pipe can also be used to advantage for repairing bronze and brass castings. Bronze castings, being generally very costly, the repairing of them by this process is of considerable interest. Cracks or flaws are first to be well cleaned, the blow-pipe applied, and when the metal begins to melt the interstices are filled by bronze wire held in the flame.

Brass castings can be repaired in the same way; but part of the zinc being burned away by the oxy-acetylene flame, the color at the place of repair is changed.

The oxy-acetylene blow-pipe can also be used advantageously for brazing, when two large surfaces of metal are to be joined.

Sometimes it is better to braze than to weld copper when the metal is to support elongation and bending.

GALVANIZED NAILS.

By PRACTICAL GALVANIZER.

One of the rapidly growing industries of this country is the production of galvanized nails for building purposes. Only a few years ago their use was confined almost entirely to the seaboard towns, and more especially to the boat building trade. Of late years, however, builders in general are fast becoming familiar with the satisfactory and economical results obtained by their use where rusting out would prove detrimental.

For such purposes as shingling, slating, lathing, fence building, etc., the economy of using galvanized nails is apparent. While the iron rust which forms on a plain nail burns the wood, causing premature decay, the zinc oxide forming on a galvanized nail acts as a preservative, and tends to protect the surrounding portion of the wood from rotting.

In the olden days the only method pursued in galvanizing nails was to immerse the material in molten zinc by the use of perforated baskets, and then throw them into water to cool and set the zinc. While this method left the nails rough and unsightly, the coating was ample to protect them from corrosion. Galvanized nails are frequently shown which, after having been exposed to the elements for upward of thirty or forty years, are found to be in perfect condition.

But the trend of the times is working vast changes in this now important industry. The constant endeavor to lessen the cost of production has brought forth numerous devices and processes, many of which, while successful in producing a cheap product, owe their success entirely to the fact that they enable the operator to apply an exceedingly thin film of zinc. Some unscrupulous parties even go so far as to coat their product with lead or solder, and brand it as galvanized. Nails coated by these methods naturally prove unsatisfactory, as they invariably rust out in a short time, and the deceived consumer loses faith in galvanizing in general.

While there are many reliable brands, it is a difficult matter, even for an expert, to determine from the appearance of a galvanized nail as to whether or not its coating is of sufficient thickness to afford the desired protection. Happily we have at hand an infallible though simple test which may be readily applied at any time.

Pure zinc, owing to its extremely brittle nature, will crackle and flake from a well-coated nail when bent at right angles, while a thinly coated nail, or one which has been leaded or soldered, may readily be bent without noticably affecting its coating. This fact is taken advantage of by shrewd buyers, who never fail to apply the bending test before accepting galvanized nails bearing an unfamiliar brand. It should be borne in mind by everyone having occasion to handle these goods, that they may determine the thickness and quality of the coating and detect an inferior article as quickly as an expert.

METHOD OF PRODUCING CASTINGS.

A patent granted to George Hale Brabrook, of Taunton, Mass., covers a process of making castings, such as ornamental bronze placques and similar articles, without flaw. Heretofore the main difficulty in making thin castings of this kind has been in keeping the metal sufficiently fluid to flow and fill the entire mold. The new invention uses amorphous or red phosphorus which, when the mold is ready to receive the molten metal, is sprinkled in a thin layer within the cavity of the mold so that the metal will come in contact with it when poured. Or the phosphorus may be mixed with kerosene oil and then the mixture sprayed on to the mold.

ANNEALING CRUCIBLES.

PROPER AND IMPROPER METHODS.

Among the various complaints registered against the crucible manufacturer, there are two that are most exasperating. One is what is commonly known as a "scalp," and the other is usually referred to as "pinholes." They belong to the same family, the only difference being that the one is more exaggerated than the other.

In order to illustrate this we herewith produce a cut showing three crucibles which might bear the relationship of triplets. They were born at the same time, made from the same formula, dried in a natural way side by side, and burned together in the same kiln. They are exactly alike when started out for service.

Fig. *C* on its journey to Mr. Brown's foundry meets with a spell of wet weather, it absorbs an excessive amount of moisture. Mr. Brown's melter does not notice or consider the abnormal weather conditions; he proceeds to anneal "just the same as we always have done," and places the crucible on a very hot muffle. The heat is too sudden to dispel the moisture according to natural laws, the moisture becomes steam, then the explosion.

A B C

THE THREE CRUCIBLES.

Fig. *B* is started in another direction and finds its way into Smith's foundry. The weather conditions may have been a little more favorable, and Smith's melter may have used a little more discretion in placing it on the muffle, or, the muffle may not have been quite so hot, but that not enough discretion was used is shown in the cut. The explosion was not as complete as in the case of Fig. *C*, but enough to show that the natural laws had again been disobeyed.

Fig. *A* happens to drop off in the Jones foundry. The weather is fine and conditions normal. The crucible contains moisture, but no more than ordinary. It, like its brothers, has to pass through the annealing process, and, although it was treated just the same, went on the same hot muffle, received the same sudden heat, it to all appearance is perfectly sound.

It is charged and put in the furnace. One, two, three and possibly seven or eight heats have been run off when all at once a little stream of metal is seen to ooze from its side. The pot is taken from the fire, metal removed and allowed to cool. We examine it and find the walls nearly as thick as at the start. The crucible has glazed nicely and there seems no reason why it should develop a weakness at this one particular point.

We break the crucible at this spot, and there woven in the wall we find a thin sheet of metal. The crucible has sustained an internal rupture in its annealing, or in other words, a small fissure has been formed, and it required a few heats for the hot metal to work its way into this fissure and a few more to work its way to the outside.

The cause that produced the effect in Fig. *A* was the same cause that produced the effect in Fig. *C*, but in a less aggravated form, yet the ultimate result was more disastrous to the user.

The crucible manufacturer gets a letter from Brown, Smith and Jones. Brown and Smith both write that "the pots broke before we put them in the fire," while Jones contents himself by saying "they only run seven or eight heats, and I usually get thirty from your shipments."

There is one paragraph in all three letters that is invariably synonymous. It is this: "We handled these crucibles just the same way we have handled them for years." "Handled them the same way, etc.," is exactly what should not be done unless it is worked from the safe extreme.

There can be no fixed rule to govern the annealing of crucibles, as conditions differ; but whatever the conditions, there are four points that *must* be strictly adhered to:

First: The temperature must go above 250 degrees Fahrenheit.

Second: This temperature should be reached gradually.

Third: This temperature must be held a sufficient time to allow the moisture to thoroughly disappear.

Fourth: The crucible must go in the crucible furnace with a temperature above 250 degrees Fahrenheit.

Fortunately these troubles are not general, and as a rule confined to small shops.—*Graphite.*

BRASS AND BRONZE INGOT METAL.

By John G. Neiderer.

He had never seen The Metal Industry. I turned over the pages of the 1904 volume until we got to the May issue, where his eyes rested on the first page and he read the article headed "Brass Ingot."

"I wish," said he, "that I could use brass ingot; we have tried it but never got good results a second time. The samples proved excellent, but lot number two would never fill the bill and positively was not the same mixture as the sample sent us to try."

Of course this was simply a case of dealing with an irresponsible dealer. My own experience was that where we had had any amount of trouble in mixing the very best of new metals, we positively had no trouble when purchasing brass ingot and using same in our very best work. In our experience of two years' continual casting of some of the most trying ornamental patterns such as one meets in the finer class of chandelier work, using several hundred thousand pounds of ingot mixture, brass and bronze, we never had cause to complain. The castings were not only perfectly sound, but there was absolutely no fault to be found with the results given us by this metal in two years' smelting. The uniformity of color and structure was absolutely satisfactory, and it bore out in every particular the points made in the article on the use of ingot metal if purchased from responsible dealers.

The great point is, as you say, alloys which have been melted make better castings than those which are first used without pouring into ingots.

As you say, judgment must be used in purchasing ingot metal, the same as one would in purchasing copper, and to buy only from reliable manufacturers who have proved capable of producing the quality and standard required.

The bronze casting of the horse is a copy of the well known production by the artist Ireane exhibited at the Centennial in 1876. This bronze was cast by the writer of an alloy purchased in ingot form and is an alloy of bronze with zinc predominating. The coloring is done with oxide of iron and heat. I am convinced, from many years' practice, that a zinc bronze lends itself best to these colorings, as well as the acid oxidize colorings. The closest examination of this bronze will show no plugging except in the chaplet holes; it will be found flawless and sharply cast—a fine example of what can be done with ingot bronze if of proper quality.

BRONZE INGOT CASTING.

The yellow metal casting of the ash tray is a copy of model by Graziani; it is gold plated of antique finish. An examination of same will show no plug. It is a perfectly close casting, sharply brought out—flawless and a beautiful specimen of what can be accomplished with ingot brass.

Both of the above castings are perfect castings and could not be improved upon in any manner by using new metal. If you try ingot metal simply make a contract with your dealer that all ingots delivered must stand the test of analysis or the goods will be returned. If your dealer is handling good metal he no doubt can show by records that he has furnished others with such ingot metal to their satisfaction.

MORE ON THE "CIRE PERDUE" PROCESS.

By D. J. Semal.

In the August issue of The Metal Industry I mentioned making molds with brick dust, but as I did not want to make it the main topic of the article, I passed over without giving any details. In this article, by giving different modes or processes I shall endeavor to give a clear idea to the uninitiated ones in the "Cire perdue process," a process that has been used in China and Japan for centuries, and was practised in Europe until the middle of the sixteenth century, and the last well known statue was Benevenuto Cellini's large statue of Perseus, now in the Loggia de Lanzi at Florence, as we know this great artist lived in the period 1500 to 1572.

Lately it has revived in France. Barye, the well-known modeller of animals, always employed it. In England it is now also practised. About sixty years ago Sir Francis Chantrey used a process very similar, but under these circumstances should be called "casting from nature," as instead of a wax pattern he uses leaves or sprigs of trees; he takes the finest sifted and ground up river sand, and encloses the leaves and sprigs in it; the whole is then dried and thoroughly baked, by which process the wood is carbonized; a strong blast of air is then sent through the apertures, which removes the carbon and leaves a cast of the object, and that serves as a mold, into which he pours his melted bronze.

The above will give the idea to the reader as to what he can do. Instead of leaves and sprigs he uses a lizard, a frog, a crab, or any other object.

Those who have no strong blast of air can shake as much of the carbon as will come out and then pour in some quicksilver; this will search in all crevices and push ahead all dirt and clean out the mold.

Another mixture that will do for "cire perdue" mold is one of clay, charcoal and sand tempered with water, so as to be very plastic and capable of readily taking the minutest impressions. The first layer of this mixture is allowed to dry on the pattern or model, as you want to call it; then a second, and so on, until the mold is thick enough. After the mold has dried sufficiently, if you have not made the gate and vents on the model for the introduction of the melted metal you can now cut them out. Before the mold is used, it is thoroughly dried and heated nearly to redness; the wax then naturally runs out, and leaves the exact space that the metal is to fill up.

Always have in mind that the chief difficulty arises from the presence of air bubbles, so it is advisable to always have the molds made as porous as possible and warm when casting in them.

When using brick dust, two parts of it and one of plaster is usually used for the first couple of coats or layers; then coarser brick particles as the mold nears completion. For very large molds whole bricks and loam, horse dung, etc., are often used, as well as iron supports, and in this case equal heat must be used, otherwise these iron supports will bend and twist; consequently we are liable to have a cracked mold with the vents choked up. Sometimes for small work the first coat of brick dust is used, with albumen of eggs or dextrine instead of plaster.

Another simple method is to mold the pattern in fine sand which has been tempered with salt and water and placed in a warm place to dry; then, on account of the salt, you can subject this kind of a mold to greater heat to let the wax run out or to let the mold absorb it. The metal should be poured while the mold is hot.

For small work, instead of using shellac to give the wax a harder surface, collodion is advisable, as this will burn away without leaving residue. As this is guncotton in sulphuric ether, it is explosive in the bottle near fire, but as a film on the pattern it burns off evenly without danger. I hope the above article will convey to the reader's mind a good idea of the "Cire perdue" process, so that he can use other materials when the occasion demands, such as cuttle fish, pumice stone, asbestos, ashes, saw dust, coke; the last three named I would only recommend for filling or body work.

YELLOW METAL INGOT CASTING. (See Page 294.)

The oxidation of metals in the foundry has been diminished by keeping the molten metal surrounded as much as possible by reducing gases, both while melting and while pouring. The pernicious effect of the iron stirrer for mixing alloys has been demonstrated, and one of graphite substituted.

A correspondent from the Peninsula states that the projected railway from Hongkong will be likely to traverse the rich mineral regions of Siamese Malaya. Lang Suan has a tin supply that can not be exhausted in a hundred years to come, while the same may be said of Renang. There are 70 mines in the region of Lang Suan, most of which are worked by natives, but the European concessions in the latter place, as well as in Renang, are exceptionally encouraging and already are giving excellent returns.

THE PARABOLA OR SMOKE BLACK FINISH.

By Chas. H. Proctor.

During the past two years a very artistic and fashionable finish has been placed upon the market. To many platers the method of its production has been somewhat of a conundrum.

This finish is known as the parabola, or smoke black, and is nearly always produced in connection with the old brass finish, but very handsome effects may be had in brush copper or silver, the same method being followed. In the minds of many platers this finish is associated with the black nickel or iron solution finishes in antique brass effects; but upon close examination by an observant eye it can readily be seen that it would be almost impossible to relieve the black deposit so formed upon the metal surface, and give the shaded effects that seem to blend through black to brown and brass without any perceptible ending or line of separation. This is where the puzzle comes in to the uninformed. To some, who do understand the method of producing the black, the trouble to retain it when so produced is the great stumbling block. Any method of lacquering will invariably remove the black, so the work comes to naught.

But like many other finishes the method is very simple when known. The basis is the brush brass finish. After producing this effect the article is lacquered by brush or dip. The medium may be hard oil finish diluted with turpentine or No. 1 extra copal turpentine varnish thinned with the same medium. These bodies naturally dry slower than the spirit varnishes, but when thoroughly dry give beautiful lustre effects. These mediums are used by some smoke black finishers, but a quicker operation is to use white French varnish cut in denatured alcohol and diluted with a mixture composed of equal parts of denatured alcohol and fusel oil, as a thinner, using equal parts of the varnish and the thinner for the lacquer.

After drying in the usual way the articles are ready for the parabola or smoke. This is accomplished by using a common gas jet flame which should not be too large or the flame too bright, to avoid too much heat. Methods of handling and stopping off must be furnished; a little experimenting in this line will result in the easy handling of articles of any shape.

The heat of the flame softens the varnish and a smoke black finish is produced as the article is slowly revolved over the flame. At first there is a darkening of the metal producing a dark olive green. The article is then smoked deeper at the bottom to obtain a deep black and gradually revolved until the black blends to brown and then to the dark olive. The articles are then placed by themselves and the operations continued until sufficient have been finished to place in the lacquer heater. After bringing up to the usual temperature the articles are removed and placed where they can dry. After this they are polished upon the smoked parts with a slow running cotton flannel buff wheel or with a cloth of the same material. This ends the work.

Under the influence of the heat the smoke black combines and becomes a part of the lacquer or varnish surface, and it is not possible to relacquer in any manner or by any method, as this would have a tendency to soften the applied black or remove it entirely.

The Treasury Department has decided that ground carborundum, being identical in use with emery and nearly identical in material, is dutiable as ground emery by similitude, and is not free of duty as "sand."

A NEW SOLDER FOR ALUMINUM.

Letters patent covering a new solder have been issued to Carleton Ellis, of Boston, Mass., under date of August 13, 1907.

It is claimed that this solder is strong and durable, has a low fusing point and unites easily with the aluminum. It consists of an alloy of tin, zinc, aluminum and manganese, tin being the constituent used in greatest relative amount; the manganese is added only in relatively small quantity. The latter ingredient is used to improve the texture of the alloy and to increase the durability of the soldered joint. Chromium may be added if desired. Suitable proportions for a satisfactory solder are tin, 30 parts; zinc, 7 parts; aluminum, ¾ part; manganese, 1-10 part, or using chromium with manganese, tin, 30 parts; zinc, 8 parts; aluminum, 1 part; managenese q. s.; chromium, 1-16 part. The solder may be prepared by fusing together the above described elements. If desired the manganese or chromium may be added in the form of their respective aluminum alloys. To secure the best results the fusion should be made in a closed crucible, as free access of air to the fused alloy appears to injure the working qualities of the resulting solder.

CUSTOMS CASES TO BE DECIDED BY THE U. S. COURTS.

This month and next, upon the opening of the United States Courts, several important cases will be heard on appeal from decision of the Board of U. S. General Appraisers. In one of these the protestant is the William Cramp & Sons Ship and Engine Building Company, of Philadelphia, and has reference to the rate of duty applying to alloys composed of manganese, iron and tin, and of copper and tin. This was classified in part as relating to alloy composed in chief value of aluminum, and in part as articles composed of metal not specially provided for. The Board held the alloys duitable under the paragraph relating to unwrought metals and metallic mineral substances, and overruled the importer's protests because that contention was not made. The importers claimed the Board should have held the articles dutiable either directly or by similitude, as ferro-manganese, ferro-silicon, etc.

Among other cases to be decided are those of United States *vs.* Tiffany & Company, bronze statuary; the C. Newman Wire Company *vs.* United States, draw plates and wortles; Hermann Boker & Company *vs.* United States, nickel anodes, and John Bromley & Sons *vs.* United States, finished castings.

In a report from Kingston, Jamaica, the consul states that while numerous attempts have been made to work copper, beginning as early as 1857, the mining of the metal has not hitherto proved successful commercially. It now appears that, owing to the exertions of an expert American mining engineer, the difficulties which have prevented the profitable working of the metal have been overcome, and that paying copper will be added to the list of staple products of the island. The ore contains gold and silver as well as copper.

The deposits of tin in the Congo region extend along the Lualaba below the falls of Nsilo for a distance of 175 miles, and explorations thus far made assure the possibility of extracting 20,000 tons, having an estimated value of $16,000,000. According to the report of the consul-general of Boma there are also being exploited valuable deposits of gold, platinum, palladium and iron.

AMERICAN BRASS FOUNDERS' ASSOCIATION.

An Open Letter from the Secretary.

So many inquiries have been received regarding the purpose of the American Brass Founders' Association, that it seems advisable to emphasize in the technical press just what the society stands for, and to make plain who are eligible to election. Both of the puzzling points are tersely explained in the Constitution, and all who are interested are urged to read carefully the text which is presented in our Department of Associations and Societies.

For the information of those who have not followed the history of this association, it may be stated that at the annual convention of the American Foundrymen's Association, held in Philadelphia May 24, 1907, a new society was organized, for the single purpose of taking care of the interests of the non-ferrous metals, just as the American Foundrymen's Association is taking care of the interests of iron and steel.

The two societies are allied, and it is intended that they shall keep in close touch with each other, and hold their annual conventions at the same time and place.

As stated in the constitution, the purpose of the American Brass Founders' Association is educationel. The aim of the society is to solve the problems of the non-ferrous metal industries as the American Foundrymen's Association has solved and is solving the problems associated with the manufacture and founding of iron and steel; to encourage habits of study and investigation; to spread the use of technical and scientific literature; to devise systems of apprenticeship; to establish trade schools; in short, to educate, so as to improve the product and diminish the cost.

In its extreme youth the new society cannot hope to do such great things as later on it may aspire to accomplish. But it is certain that even this first year the society will hold a convention, in connection with that of the parent organization, at which papers relating to our own industries will be read, and these will later be published and distributed free to all members.

IMPORTANT. Although the name of the new society is the American Brass Founders' Association, its interests are by no means limited to the foundry. The society is devoted also to the interests of brass goods manufacturers, aluminum workers, platers and polishers, finishers of gold and silver, producers of copper, zinc, lead, etc., in short, to the interests of the entire metal industry, excluding iron and steel.

The membership of the society is constantly growing, and it is a source of gratification to the officers to note the high standing of those applying for membership. Among those who have joined recently are the following:

A. L. Haasis, Jos. Dixon Crucible Co., Jersey City, N. J.; Brass Founders' Supply Co., Newark; J. H. Gautier & Co., Jersey City; Grand Rapids Brass Co., Grand Rapids, Mich.; Wolverine Brass Co., Grand Rapids, Mich.; Pembertty Injector Co., Detroit, Mich.; Somerville, Ltd., Toronto, Ont.; O. J. Mousette, Brooklyn, N. Y.; Dings Electro Magnetic Separator Co., Milwaukee, Wis.; Lawrenceville Bronze Co., Pittsburg, Pa.; Hugh L. Thompson, Waterbury, Conn.; Edward S. Toothe, New York, N. Y.; Alfred Nathan, New York, N. Y.; J. D. Smith Foundry Supply Co., Cleveland, O.; The Foundry, Cleveland O.

Those contemplating making application for membership are invited to communicate with the secretary, who will gladly furnish any further information wanted concerning the society. Blank membership applications and copies of the constitution can be obtained from the same source.

ANDREW M. FAIRLIE,
Secretary.

P. O. Box 197, McCays, Tennessee.

METALLURGY AT JAMESTOWN.

Metallurgically speaking, the Jamestown Exposition does not contain an extensive display of the metallic arts, but it has such a number of interesting features which are well worth examining by all who desire to see the latest and best examples of exposition architecture and exposition art that the fair, from a visitor's standpoint, is an unqualified success. The buildings themselves are far superior to those generally constructed at large fairs, being built of brick instead of the customary wood and plaster. They have white trimmings which gives the red and white colonial effect and are beautifully illuminated. The situation of the exposition on the broad waters of Hampton Roads, Va., and opposite the famous resort of Old Point Comfort is a most delightful one and as the Government has built a splendid concrete pier at the water front of the grounds, the water approach is most attractive either by day or in the evening at the time of the illumination.

The Government exhibits, showing the work of the various department is, as usual, in Governmental displays, particularly fine, likewise the State exhibits showing their special resources. These relate mainly to the raw and heavily manufactured materials produced by different States more than to purely manufactured products, such as metallic goods, machinery and other wares. In the Metallurgical Building, however, the State of Michigan through its Normal College has some fine specimens of copper in ingot, cake, bar and wire, also some choice samples of native copper and copper in matrix rock. The Michigan Wheel Company of Grand Rapids, Mich., show in the same exhibition space a stack of bronze propeller wheels varying in size from their smallest to the largest. The company announce that they are the largest manufacturers of bronze propeller wheels in the world. Other exhibits of interest in the Metallurgical Building are a case of aluminum manufactured goods in all forms, shown by the Aluminum Company of America, Pittsburg, Pa., and a display by the State of Georgia of aluminum ores, including various grades of bauxite. Throughout all of the other buildings there were fine examples of metal work in connection with the displays of all kinds of machinery from locomotives to sewing machines. In the general, the Jamestown Exposition is a very creditable one both in its industrial, architectural and structural exhibits besides the glimpses the traveler gets of a historic company and southern life and customs. The exposition is of interest to every metal man, no matter what his position or trade.

In melting furnaces there is a wide and interesting field for metallurgical research, whose cultivation would yield results both of high practical and high theoretical interest, and yet it is comparatively untouched. What is wanted is complete data concerning the specific heat of solid and liquid alloy, and latent heat of fusion. These, combined with the determination of the heat evolved in the alloying, would furnish a sound basis for a practical theory of alloys, besides enabling workers with these alloys to control the efficiency of their furnaces, and, in general, to know with scientific exactness what they are accomplishing."

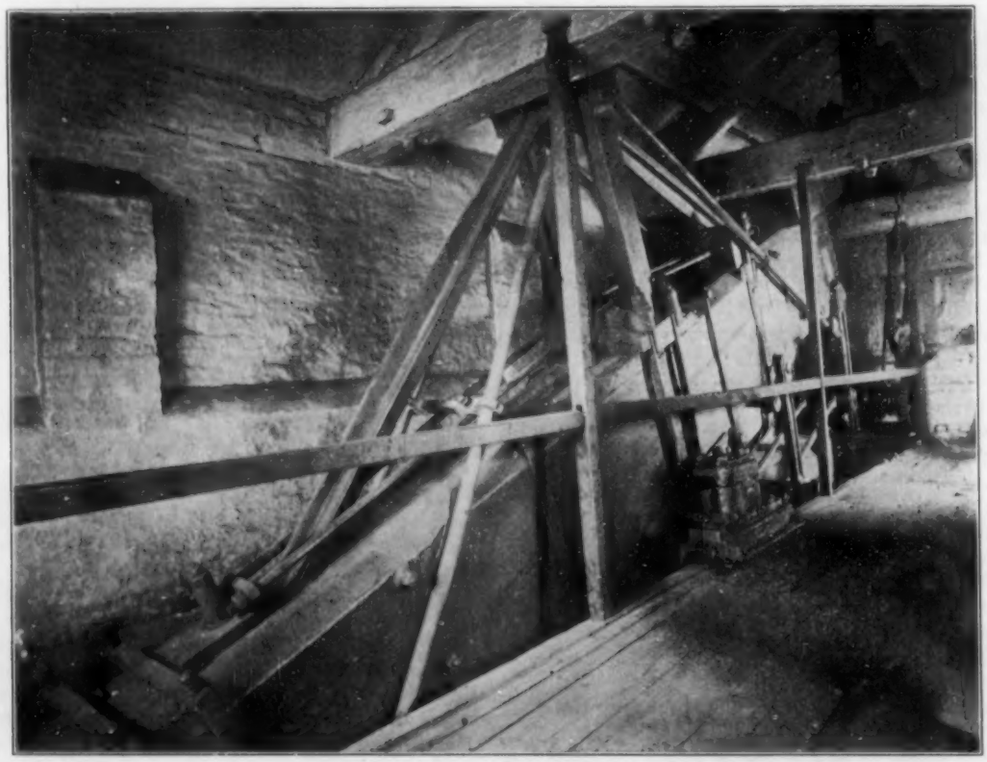
ANCIENT BIRMINGHAM METAL WORKS.

(By Our Birmingham Correspondent.)

AN ENGINE 130 YEARS OLD.

The firm of Charles Clifford & Son, Ltd., Fazeley street and Dogpool Mills, Birmingham, have recently attracted some attention by their production of a new white metal for which it seems likely a great variety of uses will be found.

The firm is deserving of special attention, not only from its enterprise and up-to-date methods, but because its establishment happens to be one of the most interesting links with the distant past when Birmingham was regarded as the metallic "Hub of the Universe." It seems almost incredible that until quite recently an old wooden beam engine was still in operation dating as far back as 1767. A very awkward cumbersome beam it appeared, the inventor of the spinning jenny. But the cotton inventor would have been practically helpless without the co-operation of Wyatt, who furnished the engine power. But it was two years before Wyatt took out his first patent for a steam engine, and eight years before that eminent inventor erected his first engine in a cotton mill, that a primitive beam engine was erected in the year 1767 at the Fazeley Street Works. It is believed to have been put together by a mechanic named Pickard, the same probably who in 1780 took out a patent for a rotary engine. A couple of years ago that old engine with its beam was still working up to 120 horse-power, and driving thirteen sets of rolls. During its long career it had been often repaired and improved, but two parts



OLD ENGINE BEAM IN BRASS WORKS OF C. CLIFFORD & SON.

but at all events it is no small achievement to have rendered 135 years' continuous service. As a matter of fact, the engine is still running, but the wooden beam has been replaced by an iron one.

The firm at present are famous for their large output of sheets and bars, bolts, all kinds of copper, brass, zinc, tin, yellow metal, aluminum, etc. and they make in large quantities copper and brass tubes for engine boilers wire for all purposes, and a great variety of knick-knacks in these various metals for use in railway carriage equipment and decoration. Messrs. Clifford still make a specialty of manganese-bronze and phosphor-bronze. At the present time, several leading British railways get their metallic decorations from this establishment. But the mill in Fazeley street was originally a cotton mill, itself, the outgrowth of a still more primitive concern in the Old Priory, Birmingham. That establishment is intimately connected with the earliest experiments in cotton making by machinery. The inventor of the cotton machine, a man named Wyatt, was the real forerunner of Arkwright, still remain unchanged—the original beam built up of oak 28 feet long, 3 feet deep, and two feet wide, and a connecting rod 30 feet long and 15 tons weight. The beam was fitted with a counter-weight to assist the ascent of the piston, and the cylinder, 54 inches diameter and 9 feet 6 inches stroke, was over a century old. The inscription showed that it was cast at Coalbrookdale on August 2, 1802. A most curious circumstance is that an iron beam which lay in the yard about fifty years in readiness to replace the oak specimen was eventually re-sold to the makers, Watt & Co., for the simple reason that the old oak beam showed no signs of giving out. As a matter of fact, it kept in operation for several decades longer. Our illustration shows what a massive and clumsy piece of mechanism this old beam was. But if not ornamental, it lacked nothing in serviceableness.

The firm even now retains several claims to individuality, which suggests a forward as well as a backward view. Until recently Clifford's were the only firm in the provinces who rolled zinc. It is well known that this

metal has of late years greatly increased the variety of its uses, mainly because by carefully graduated heat and judicious rolling it has been made much more ductile and manageable.

Tin-zinc has also long been a quite exclusive specialty of silvery white appearance and applied amongst other uses to the manufacture of buttons.

Of course, the firm are fully alive to the necessity of exercising the fullest economies, and all the refuse is carefully washed, ground and melted and refined, so that every grain of copper or other metal is recovered.

Their second establishment, a short distance away, rejoices in the old romantic and highly suggestive name of the "Dogpool Mills." This establishment is even more ancient than that of Fazeley street, a fact demonstrated by the presence there until recently of the old water wheel used for driving machinery in the days before steam power came into general use.

Up-to-date appliances are quite too numerous to mention. Generally, it may be said there is no mechanism necessary for the swift and effective manipulation of metals which is missing from this remarkably comprehensive establishment.

In regard to the personalia of the establishment, the managing director, T. G. Locker, may be said to have done his best, as far as human longevity may, to rival the performance even of the old beam engine itself, inasmuch as he entered the establishment fifty-seven years ago, and has witnessed the enormous development of the firm's trade. Mr. Locker is a typical Birmingham man, not only in his technical knowledge and business success, but in his devotion to the fine arts, and especially to the fascinating study of music. For many years he conducted classes and organized concerts which were highly popular in Birmingham, and which evoked from his fellow-townsmen a great public tribute, taking the form of the presentation in the Town Hall of a handsome address and testimonial.

Many American engineers visiting Great Britain have taken the opportunity of visiting this famous establishment and inspecting its quaint mechanical survival of the early days of the steam engine.

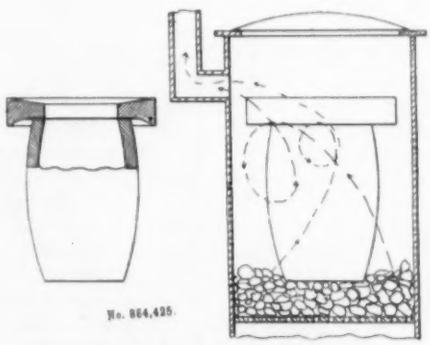
BIRMINGHAM NOTES.

(From Our British Correspondent.)

An informal intimation has reached Birmingham that the Home Secretary proposes shortly to issue an order introducing the compulsory element with regard to the clearing of brass foundries from injurious fumes. It will be remembered that an article appeared some time ago in THE METAL INDUSTRY, describing the methods employed by Rainsford & Lynes' apparatus in extracting fumes from pots of molten metal. Several Birmingham firms have already adopted this with excellent effect, but other makers are careless, with the result that life and health suffer to a considerable extent from the inhalation of the dust from metal polishing. For some years past the local factory inspector has been paying special attention to this matter and is known to be in favor of legal pressure. The Home Secretary has taken advantage of the issue of new rules under the Factory Act to insert a proviso dealing with this matter. The better class manufacturers will welcome the reform, but in other quarters, where additions to working cost on whatever ground are resented, the new rules will naturally be unpopular. The Workmen's Association have for some time past agitated for compulsory enforcement.

METAL MELTING FURNACE.

An invention patented by Samuel Knight, of Chicago, Ill., August 27, 1907, and by him assigned to the Waterbury Crucible Company, of Waterbury, Conn., relates particularly to an apparatus for melting such metals as brass, copper, aluminum and alloys. The main object of the invention is to reduce the amount of fuel necessary for producing fusion, and also reduce the time required for heating. The apparatus uses a ring or flange which is so proportioned relative to the crucible with which it is used and relative to the furnace in which the heat is



BRASS MELTING FURNACE.

applied as, first, to permit charging the crucible, second, to extend laterally beyond the top of the crucible so as to deflect the burning gases and, third, to allow sufficient draft around the sides and top of the crucible to the flue. The top of the ring is so shaped as to permit the metal to be piled up and yet insure that it will all run down into the crucible when melted. The under side of the ring is so shaped as to provide a secure seat on the top of the crucible and to deflect the gases downwardly as well as laterally.

COPPER PRICES IN BIRMINGHAM, ENGLAND.

We have received from our British correspondent at Birmingham the following in regard to copper prices:

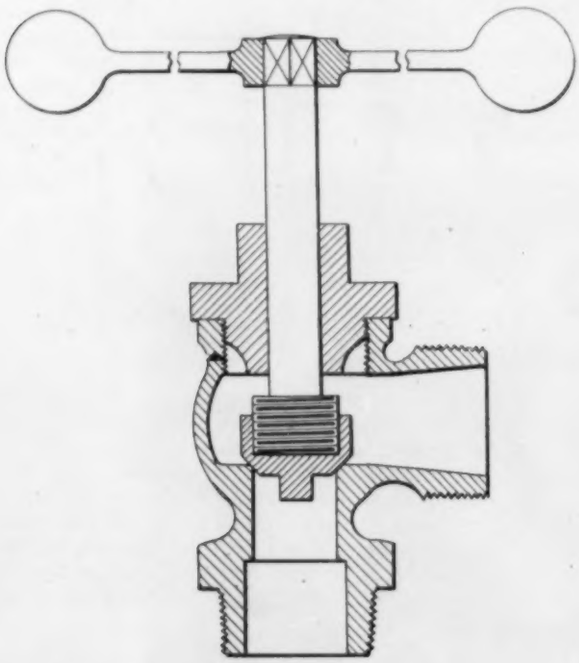
Birmingham is very deeply interested in the copper collapse, this metal entering into the composition of a large number of the city's productions. The present price is £67 10*s*., as compared with £112 10*s*. in the spring, and yesterday there was a fall of three pounds per ton. The present is the lowest price recorded since the summer of 1905. The high prices have greatly injured Birmingham trade, consumers holding back their orders wherever possible. Fortunately for Birmingham houses, they hold very small quantities of raw material. Within the last twelve months, warehouses have been stripped almost completely of half-obsolete copper stock, which has found its way into the melting pot to meet the requirements of the electrical trade. The brass trade has felt the pinch of high prices very severely, and the fall will be very welcome as a means of cheapening the cost of goods which for some time past have hardly been able to find purchasers. Copper enters so largely into motors that the fall will have the effect of materially reducing the price.

Dr. Banks, of Ricketts & Banks, of 104 John street, New York City, the metallurgists, is preparing a special report on the extraction of metal values from the ores of the Cobalt district. The report will deal largely with the ores of the Cobalt Central mines, of which Dr. Banks has made a special study and exhaustive tests. The concentrating plant, which is expected to make the greatest saving of values, at a minimum of expense, has been set up at the mines, where it is about ready for operation.

QUICKEST AND BEST METHOD FOR GRINDING VALVES.

By Wm. Hirschmann.

The quickest and best method must be governed by the valve itself. Some valves are so constructed that it is impossible to grind them in any other manner than by hand. If the valves are easily handled, the best way to grind them is to place the disc on a spindle or stem, which has no thread, and which revolves through a bonnet or steel guide which fits the body of the valve. This is placed in the live head of the lathe and the valve is held



VALVE GRINDING.

in the hand and when ground in is sure to be in line with the thread in the body.

When it is not practical to use a lathe a double ball arrangement can be used; that is better than actual hand-grinding, although it is practically hand-grinding, the hand being the motive power. This consists of balls of lead, fastened to a socket in the centre, each ball an even distance from the centre, so as to balance. This is placed on the valve seat to be ground in, and revolved by hand very rapidly, and keeps an even pressure at all times on the seat being ground in. If a seat is very rough it may have to be cut down. In such a case flour emery is very rapid in action, but where seats are good very little grinding with ground glass, soap and water will make them tight. The accompanying tracing shows the double balls used in connection with sleeve and spindle. In using for small work the spindle can be placed in chuck, and when seat is ground in the friction of reversing will loosen it and run it off.

AUTOMATIC COCK GRINDERS AND ABRASIVES.

By W. L. Abate.

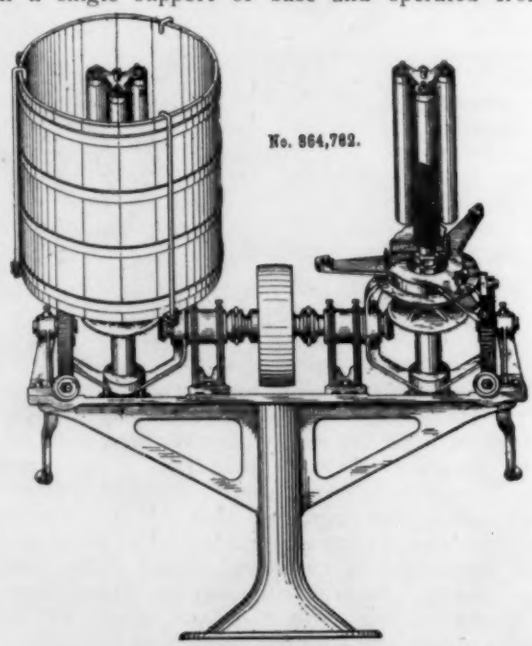
The writer has been unusually successful with automatic cock grinders. He finds that they can and do grind cocks up to 2½" in size equally as well as done by hand. Of course one has to be careful which machine he chooses for the particular kind of work he wishes to perform.

There are very few cocks being made to-day that are not ground automatically, competition being so close on this class of material that manufacturers are compelled to adopt this method of procedure. It was a hard matter to convince the manufacturers that these machines could be run successfully, and I must say that there is still plenty of room for improvement in cock grinding machines. Many of the machines are unguarded, and the grinding and abrasive material has a chance to work into the joints and connections of the machine. This is a most frequent cause of trouble, and often puts the machine out of business for days at a time. Still, even with this drawback the machines are being used to good advantage, and have cheapened the cost of grinding to quite an extent.

Regarding abrasives for cock grinding, the writer finds that the use of carborundum is the quickest grinding material now in the market, but cannot say that it is the best, for it is even worse than emery in the matter that once used, it always continues to grind the parts, as there is always some of it remaining concealed in the pores of the metal. The best job, of course, is always done with the mully sand, and for the same reason is necessarily much slower.

TUMBLING BARREL.

An invention patented by Harry J. Guttman, of Chicago, Ill., September 3, 1907, relates to tumbling barrels for use in connection with electroplating, and especially to barrels of such character that the articles may be tumbled about while being plated, thereby insuring a finished and highly polished product at the end of the plating operation. In this design two barrels are mounted upon a single support or base and operated from a



TUMBLING BARREL.

single shaft. Either barrel may be tilted or inclined at will, and maintained at any desired angle, in order that the tumbling action may be increased or diminished at any time during the operation of the machine. All the electric connections are established through the bottom of the barrel. The arbor is hollow and affords a bore or passage for establishing electric connection with an electrode within the barrel, preferably the anode. The cathodes are insulated from the barrel and electrically connected with a ring or circular plate on the bottom of the barrel, this ring being engaged by a brush connected with the other pole of the source of plating current.

UP-TO-DATE SILVER MANUFACTURING.

By C. S. M.

Since the early days of Paul Revere, when he entered his father's shop to learn the art of gold and silversmithing, there have been a great many improvements in the style and manner of producing the too numerous articles which are made by the several manufacturers of to-day. In Paul Revere's time the varied operations, as well as the appliances, were of a crude nature; there were all sorts of hand methods which were laborious and required a great amount of patience, whereas to-day the mechanic has every advantage by having the best of tools and appliances—in fact, the most modern machinery is required to meet competition.

The art of silversmithing to-day has in itself reached a very high standard and goods made 15 years ago, although but a short time to look back, would not meet with ready sales when compared with the present day output. To-day the up-to-date manufacturer must do nearly all the different parts connected with his business, melting and rolling his own metal, taking care of his shop "sweeps," and soon as possible he must melt his chloride, do his own assaying, alloy all silver used and see that it is kept up to the standard required by law, 925/1000 fine. All the numerous operations require skilled help; workmen who have given several years' time and applied themselves constantly to the different branches of the trade are the ones who are sought after.

The old-time silversmith was more competent to establis himself in business than the present day silversmith because to-day apprentices do not get the chance to learn every branch of the business; they are made more on the line of specialists, or in other words, educated to do one thing, and do that well and quick. Speed nowadays is of the utmost importance, and to the men who are quick, and at the same time do their work well, there is always ready employment. The silversmith's art requires mechanical people; I say people because besides men, women are employed to a great advantage in many large factories doing many things formerly performed by men, such as buffing, burnishing, plating, saw-piercing, engraving, and many operations are performed equally as well by them as by men and boys.

The foundation of the art is, first of all, designing, and with the varied articles upon the market to-day it is not an easy matter to design in a practical way, that is, to design an article, especially one of practical utility, without making the price to the consumer beyond reach. In the making of the more elaborate and special work the designer has a broader field to display his skill, but a great many fall down when called upon to design the plainer goods from the fact they cannot seem to keep to the economical method of making their designs so that cost of tools and labor to produce same is not excessive. The manufacture of silverware has brought out many valuable machines, thereby saving much labor on some of the simpler processes, and it's the constant desire to cheapen costs of production. The many manufacturing operations are too numerous to mention at this time, and how few of us realize the operations required to make even a simple spoon. In the first place, the silver ore is dug from the earth, then the smelter extracts the precious metal from the rock and also separates the other metals, most always found intermingled with the silver, such as gold, copper, lead, etc. After leaving the smelter it is then refined, and all impurities having been extracted it is marked by the refiner 999/1000 fine. The metal is now ready for the market for manufacturing or coining into money by the Government. But keeping to the point the metal we will assume is purchased by some silver concern making sterling ware, and the first thing after being weighed, and finding the weight in ounces and pennyweights it must be alloyed with copper to meet the sterling standard .925/1000 fine required by law. Let us here state that unless the copper was mixed with the fine silver, articles from pure silver would be too soft to be practical. The next process is to melt the quantities of fine silver and copper together, putting the copper always at bottom of the crucible, because the copper requires more heat to melt than silver, and as the bottom of crucible is always the hottest you readily see the advisability of so doing. When the required heat is reached, which is something that requires an expert to determine, it is poured in chilled iron moulds of the desired sizes, heated sizzling hot. After the moulds become nearly cold the silver is removed from the moulds and pickled out and washed clean and then taken to the rolling mill to be rolled to different thicknesses through repeated annealings to keep it soft as it is carried down to the required thicknesses. The silver, after being rolled into bars, is then blanked up and then rolled out to make up the different widths and lengths and thicknesses; then taken to cutting presses and blanked out like the shape of a spoon or fork or whatever the article required is, then it is annealed and the bowl of the spoon is shaped up. Then the handle is struck, with either a figure or a plain shape. After these operations the handles are trimmed with steel cutters close to outline; they are then taken to what is called the wheel finisher, and he removes any little imperfection on the edges, after which he faces the bowls or blades or whatever shape articles might be sent to him. After these operations they go to the fine finisher and then to the buff room for final polishing and are ready for shipment.

Hollow ware work is stamped under drop presses or is hammered out by hand, and many articles of round nature are spun in a lathe from flat discs or tubes; the articles are then assembled and soldered together, filed and made ready as before for the different departments.

Many branches are connected with the silversmith art, such as plating, burnishing, chasing, modelling, enamelling—in fact, the business requires the best of workmen of years of experience, and also demands good pay to the workmen; and to conclude, let us say that there are not many kinds of manufacturing that require so much skilled help all through the different processes as the silversmithing art.

GILDING KEY CHAINS.

By Charles H. Proctor.

Key chains made of tinned music wire and Pope's Island white metal can be very readily provided with a gold gilding. An 18 karat gilding solution consisting of an alloy of 75 parts pure gold and 25 parts nickel will prove very satisfactory for the purpose, as it gives a bright, hard deposit which will stand a good deal of wear. The solution is prepared by dissolving 6 dwts. of the gold alloy, which should be in thin sheets, in aqua regia, with the aid of heat or a sand bath. Only sufficient acid is used to dissolve the alloy so that a little of the metal remains. The solution is then evaporated to a syruppy consistency. This will give a neutral chloride of gold and nickel.

The next step is to prepare a solution of 4 ounces of chemically pure cyanide of potassium in 1 gallon of water and add the solution of gold and nickel; well mix and

add ⅛ ounce of bisulphate of soda. The anode should be of the same composition. The temperature of the solution should be not less than 180 degrees. A flash deposit of from one to three minutes should be sufficient for a good coating.

The chains should be tumbled in macerated leather with a little powdered rouge to produce a bright surface; cleaned in a hot Kalye solution, which will cleanse and not oxidize the metal, then washed in water and run through the cyanide cleaning dip and again washed. The chains are then flashed in a good yellow brass bath, washed as usual and gilded. After gilding they are dried out in a hot solution made up of 1 ounce plater's compound to each gallon of boiling water. After passing through this solution and then through boiling water they are dried out in maple sawdust. A 5 to 10 gallon solution should gild three dozen chains at each immersion. Small frames should be made up for this purpose.

MAKING EXCEEDINGLY THIN NICKEL FILMS.

The method followed by Thomas A. Edison in the making of exceedingly thin films of nickel for use in storage batteries will interest every plater. According to letters patent just issued to Mr. Edison he first provides a cathode having a polished nickel plated surface. This is first immersed in a suitable cobalt plating bath, preferably a concentrated solution of cobalt chloride with cobalt anodes and while the cathode is rotating, an exceedingly thin film or blush of cobalt, say, 0.0001 of an inch, or less in thickness, is plated on the cathode. The cathode is now washed and is then immersed, preferably without being rotated, in a solution of sulphate of copper, causing the cobalt to go into the solution and the copper to be deposited as "cement copper" in a granular, but slightly adhesive, form. The immersion is continued only long enough to result in the covering of the cobalt film with a perfect layer of "cement copper," so as to leave a part of the cobalt film still intact. This permits the subsequent films to more perfectly retain their position on the cathode and enables a very large number of films to be deposited. If the cobalt were all dissolved in the sulphate of copper bath, there would be danger of the subsequent films becoming detached during the plating, since they are deposited under a condition of tension. Great care must be taken to keep the acidity of the copper sulphate bath in the neighboorhood of 2 per cent by volume of free sulphuric acid. A substantial decrease in acidity would result in the deposit of a film of "cement copper" that would be totally lacking in adhesive properties, while, on the other hand, a substantial increase in acidity would make the deposit too tenacious and difficult to remove.

The cathode is now introduced into a copper plating bath, using preferably a copper sulphate solution with copper anodes, and a thin film of copper is plated on the chemically deposited film of "cement copper." The electrodeposited film is preferably somewhat thicker than the subsequent copper films, preferably between 0.003 and .0035 of an inch, in order to secure a firm support for the subsequent films. During this deposit the cathode is rotated. The cathode is now washed and is then introduced into the nickel bath preferably employing a concentrated solution of chloride of nickel with nickel anodes. In this bath a film of nickel of the desired thickness is deposited on the previously deposited copper film. In practice Mr. Edison makes use of nickel films of about 0.0002 of an inch in thickness, but obviously they may be of any desired thickness. Good results are secured with a cathode of about 12 inches in diameter, when the latter is rotated at from 60 to 100 revolutions per minute in the nickel bath.

The cathode is again washed and a second film of copper is electrolytically deposited as before. This copper film, as well as the succeeding ones, is made just thick enough to insure the complete separation of the nickel layers and permit the ready access of the solution, for which purpose a thickness of about 0.0001 of an inch will be sufficient.

The operations described are repeated, alternating layers of copper and nickel being deposited on the cathode until a composite sheet of the desired thickness is secured. This sheet is then cut longitudinally of the cathode, care being taken not to injure the nickel plated surface thereof, and the sheet is then cut up into long strips, say 10" or more in length and about 1-16" in width. The resulting long filaments are now placed in a suitable open work receptacle, for instance, a wicker basket, and introduced in an ammoniacal copper sulphate solution in which the copper will be dissolved without affecting the nickel. The preferred proportions of this solution are 80% ammonium hydrate or aqua-ammonia, 5% copper sulphate crystals, 5% ammonium chloride or sal-ammoniac, and 10% of water. In this bath the containing vessel or basket is moved up and down, either by hand or suitable mechanism, until the copper is dissolved and the nickel films are freed. By this agitation of the composite strips in the bath the time required to dissolve the copper is only about one-half that necessary if the films are allowed to remain quiescent, while the circulation of liquid through the metallic mass serves to separate the nickel films from one another.

After the copper has been completely dissolved, the nickel films are then washed and dried, preferably in a centrifugal, until all traces of the solution are removed. The films are then annealed in hydrogen, care being taken not to have the temperature high enough to weld or "freeze" the films, after which they are cut up into small pieces, in any suitable machine.

MAKING DOUBLE NICKEL SALTS.

By Charles H. Proctor.

In making double nickel salts use 1 part oil of vitriol, ⅓ part nitric acid and 2 parts water. This solution should be used quite warm, and should be held in the regular large sized acid crock, or in lead lined tanks having burned seams. It should be heated by lead steam coils. Provision should be made for carrying off the dense fumes which arise from the acids. Add as much scrap nickel as the acids will dissolve and drive off the excess acid by boiling for a short time. Then dilute it with ¼ its volume of boiling water and after it is cool filter through cheese cloth. Next dissolve commercial sulphate of ammonia in boiling water, adding as much as it will dissolve. After this has cooled add it to the nickel solution, stirring all the time, until the nickel solution loses its color and a copious precipitate is formed; this is the double sulphate of nickel and ammonia. Pour off the remaining liquid after all the nickel has precipitated and wash the crystals with a little more of the ammonium solution. The crystals may now be used, when dissolved in water, for the nickel bath, or may be evaporated down to produce the double nickel salts of commerce.

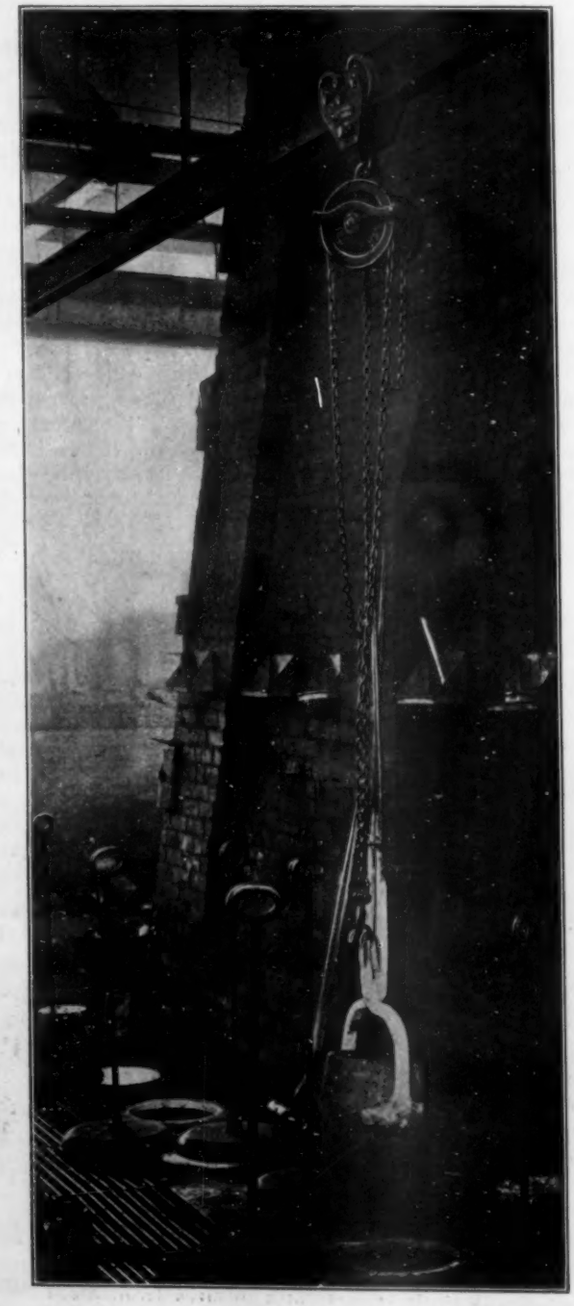
It is too much to say that science is now prepared to solve offhand any electroplating problem that might be presented. Problems in practice require scientific investigation, and as electroplating problems have been neglected, much painstaking work will be required for their solution.

INDUSTRIAL

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST TO THE NON-FERROUS METAL INDUSTRY.

HIGH SPEED TRIPLEX BLOCKS FOR BRASS FOUNDRIES.

Increasing interest is manifested by brass founders in the use of chain blocks, or other appliances for handling crucibles. In many plants the work is constantly growing heavier and the pots are naturally increasing in size and weight.



HIGH SPEED TRIPLEX BLOCKS FOR BRASS FOUNDRIES.

The general impression is that the regular one-ton triplex block is too slow for this class of service, where the maximum weight seldom exceeds 250 pounds, and quick work is required to prevent the metal from cooling. Experiments in the use of chain blocks for this purpose made by the Yale & Towne Mfg. Co., in its works at Stamford, Conn., showed that the quick speed blocks such as are used for handling ammunition in the United States coast defences are not as rapid in their action as desired for handling pots of metal. As a result a special high speed block has been developed, as shown in the accompanying illustration, which meets with the views of the brass molders in the plant of the Yale & Towne Mfg. Co.

It raises a pot of metal, weighing, with the tongs, 350 pounds, with a pull of 40 pounds on the hand chain. It is offered on the market as a quick speed triplex block by the Yale & Towne Mfg. Co., New York, and will be furnished on 30 days' trial to brass founders desiring to try it out in their works.

THE MOUSSETTE NO. 0 CRUSHER AND PULVERIZER FOR MANUFACTURING JEWELERS.

The No. 0 crusher and pulverizer built by O. J. Moussette, of Driggs avenue and North 10th street, Brooklyn, N. Y., is especially adapted for manufacturing jewelers for crushing crucible waste and sweepings in the preparation of the material for smelting. This machine is made smaller than either the No. 1, 2 or 3, which have been so successfully used by the large gold and silver refiners. It is the result of repeated demands for a machine of smaller capacity from manufacturers who do not have waste enough to warrant the installation of the larger sizes. It has proved very successful and is highly commended by those who are using it. This machine requires but ½ horsepower to operate it; it occupies a floor space of 30 by 42 inches, and weighs about 1,500 pounds. The barrel is 24 inches in diameter. It does the work of three of the old style machines.

THE MOUSSETTE CRUSHER AND PULVERIZER.

The Treasury Department has extended the allowance for drawback on solder manufactured by the National Lead Company, of New York, wholly from imported lead and tin, to cover solder manufactured in part from imported lead in ore, used by the Standard Oil Company, of California, in soldering 5-gallon rectangular oil cans at its factory at Richmond, Cal., for exportation.

DOUBLE CURRENT PLATING DYNAMOS.

The Zucker & Levett & Loeb Company, of New York city, are building plating dynamos from which two separate and distinct voltages can be taken. This means that

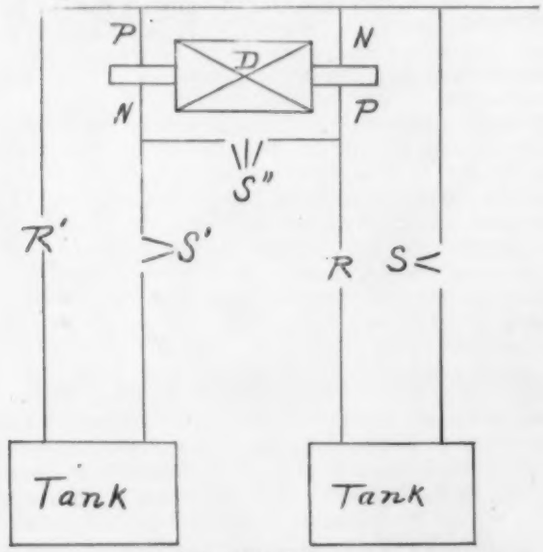


DIAGRAM OF CONNECTIONS.

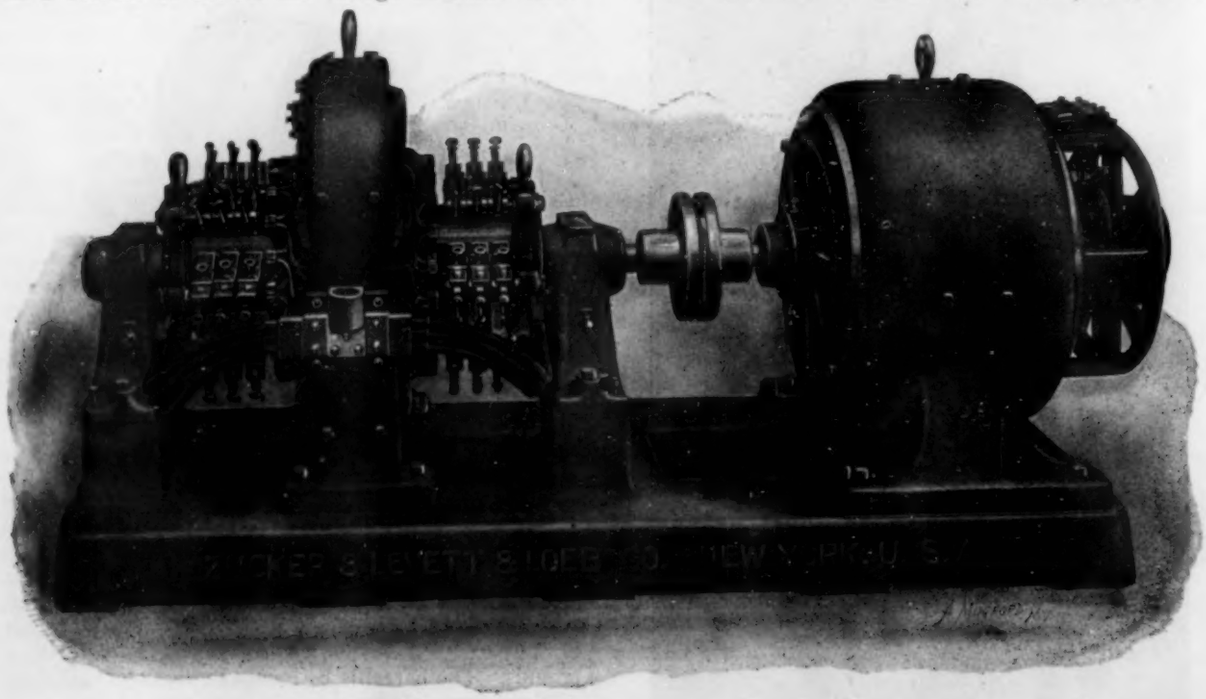
the same dynamo, independent and self-contained in every respect, can be used for plating in two separate tanks at the same time with a certain voltage, or the two currents generated by the machine can be united so as to obtain a current of double the voltage in either tank. With the aid of a rheostat this places at the disposal of the plater a current of any desired strength and gives him the benefit of two dynamos with the single machine, which requires no more attention and occupies no more space than a machine generating only one current of constant voltage.

This is accomplished by providing the armature with a double winding and with two commutators, and two sets of brushes, one placed at each side of the armature. One winding delivers a current of, say, 5 volts to its commutator, while the other delivers a current of 5 volts to the other or opposite commutator. These currents, being absolutely independent of each other, can be lead to two tanks for separate work in each. If a current stronger than 5 volts is desired, then the two currents can be connected in series and a current strength of 10 volts or pressure sent to either tank. By this means the plater has at his command either two currents of 5 volts each, or one current of 10 volts; and, by interposing a rheostat in the circuit any current from 0 to 10 volts can be had.

The diagramatic sketch here presented shows how this may be accomplished. The dynamo is designed with the two commutators as shown. From one side the current leads to the tank on the right in the usual way, and from the other side to the tank on the left, both tanks being supplied with a current of 5 volts. Now by opening the switch S and closing the switch S" and also S' the current from both commutators will pass through the tank at the left and since the connection is in series the strength will be 10 volts. By reversing the switches the current can be made to enter the right hand tank. With the aid of the two rheostats R and R', the strength can be reduced to any degree below the maximum.

These dynamos are made to run direct connected to a motor, or engine, or be driven by belt drive. When the generator field is excited from the same direct current that is used to drive the motor, a range of voltage is obtained for the generator which is ideal in its application.

These machines of the three wire system, as described above, are built in sizes from 400 to 10,000 amperes capacity.

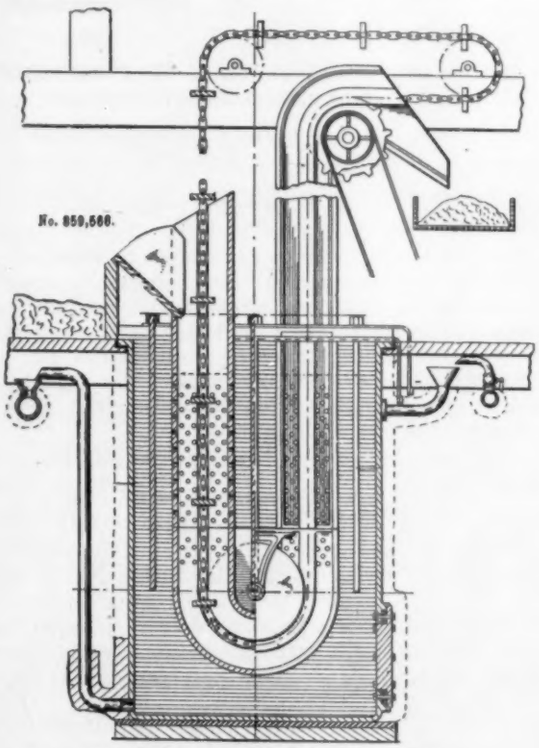


DOUBLE CURRENT MOTOR DRIVEN DYNAMO.

It will always be found more satisfactory, when producing deposits of alloys, to first prepare the copper bath, and then make the additions of zinc when the bath is in working condition.

METHOD OF DETINNING TIN SCRAP.

In detinning plants the scrap tin is usually deposited in baskets which are immersed in electrolytic baths and subjected to the action of the electric current. This operation calls for hoists, baskets, tanks, cars, trucks and turntables,



METHOD OF DETINNING TIN SCRAP.

and at each stage much manual labor is required. The object of an invention patented by Meredith Leitch, of Elizabeth, N. J., and by him assigned to the American Can Company, does away with all manual labor except that required to feed the scrap into a hopper and collect the tin powder from the cathode plates. The tin is passed continuously through the tank by means of a chain arrangement where it is subjected to the action of the current.

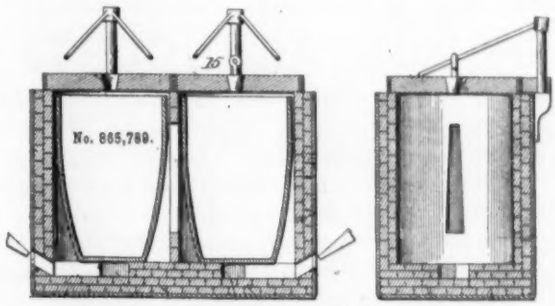
Manufacturers who use metal bismuth and metal cadmium cannot obtain the metals to better advantage than from McKesson & Robbins, 91 Fulton street, New York City. This old established firm are probably the largest importers of these metals in the country. They only handle the purest grades which are essential in their business as manufacturers of chemical salts, and they claim, on account of their connections with producers, to be able to sell the metals at prices almost, if not, on a par with the import value.

An organ manufacturer writes to the Bureau of Manufactures that he is in the market for hard drawn seamless brass tubing or phosphor bronze tubing, from $^1/_{16}$ to $^3/_8$ of an inch in diameter.

During July this country sent to Germany copper bars, ingots and plates amounting to 9,406,145 pounds, as against 8,560,978 pounds sent during the same period last year.

FURNACE FOR MELTING METAL.

Letters patent were issued to James V. Martin, of Baltimore, Md., September 10, 1907, for a furnace for melting metals. Arranged within the casing are two furnaces each cylindrical in shape and placed vertically side by side, the walls and bases of the furnaces being made of firebrick. In the base are formed channels serving as fuel inlets. The furnaces are provided with covers of fire

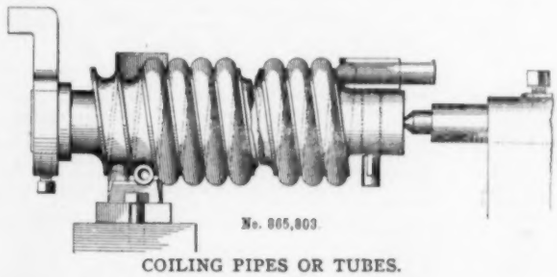


MELTING FURNACE.

clay which are hinged to standards at one side of the casing. Conical openings are arranged in the centers of the covers and a conical plug provided to fit the opening. The heat passages of the two furnaces are so arranged that the flame from the fuel burner passes into one furnace and around the crucible in it and then passes into the second furnace. In this way the hot gases are utilized to melt the metal in the furnace first entered by them and then to heat the metal in the second furnace.

MEANS FOR COILING PIPES OR TUBES.

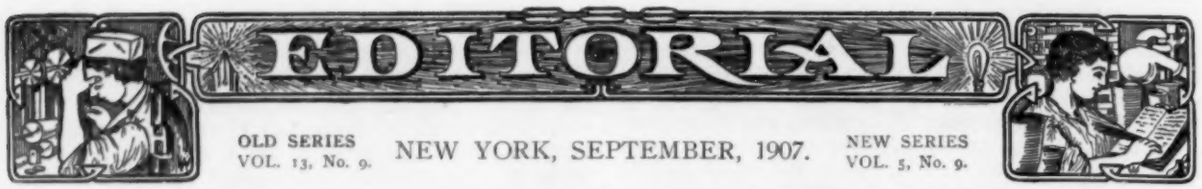
A patent was issued to Reuben R. Row, on September 10, 1907, and by him assigned to the James Reilly Repair & Supply Company, of Jersey City, N. J., for an invention for forming pipe coils such as are used in condensers, evaporators, etc. The device automatically, rapidly and accurately fashions a length of straight pipe or tubing into a uniform spiral coil without flattening the pipe and without necessitating the filling of the pipe prepara-



COILING PIPES OR TUBES.

tory to the coiling operation with a solid substance to prevent such flattening. Heretofore it has been necessary, before coiling copper tubes to fill them with some material in order to prevent flattening. In carrying out the invention a spirally grooved mandrel is mounted in a lathe and around this the tube is coiled. A traveling carriage carries a coiling die or tool operating in connection with the mandrel in compelling the tube to become accurately coiled about the same. When desired a groove can be formed in the tube as coiled, this extending the full length of the tube and being desirable in coils for evaporators and other apparatus.

The pyrometer, by indicating the temperature, tends to render furnace processes more exact.



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THE HOURS AND WAGES OF BRASS MOLDERS THROUGHOUT THE COUNTRY.

A short time ago we received an inquiry from Michigan in regard to the wages paid to brass molders, the hours they worked per day and the amount of work they turned out. Our correspondent said:

"We wish to know whether our brass molders are putting in the same number of hours, and doing the same amount of work, that other brass foundries require. Our molders put in about 7½ to 8 hours per day, each one putting up three heats, using Number 40 crucibles. We pay $2.50 per day for this work. We thought you would be able to gather from other foundries a similar statement to the one we have made."

We started right near at home on the solution of this problem and put the question to a large brass jobbing foundry in New York city. The reply was as follows:

"We pay $18 per week of 56 hours. The men make 3 heats per day and 2 on Saturday, using No. 40 crucibles."

The following reply was received from Jersey City:

"Our molders are allowed 10 hours pay for 9 hours work on the basis of 29 cents per hour. The average production is about 1250 pounds per molder. This of course varies according to the design of patterns; many have core work, etc., which are interfering factors."

From Arlington, N. J., we find the condition more complicated, owing to the combination of hand and machine work. The information from that town is as follows:

"Would say that in our foundry we do not base the work on the time which the foundry men work, as our molders are divided into two classes, both hand and machine molders. We think the inquiry shows that the people are not getting what they are entitled to, and we would suggest a basis of inquiry on the number of molds and not on the time. Some men are very much faster than others in this industry and two molders working side by side might work the same number of hours whereas one might show 25 molds by hand and the other only 20. We believe this is the only proper way to figure brass casting."

From Hartford, Conn., we learn that brass molders work 8 hours per day, for which they receive $3.

How the open shop plan works is shown by the following communication from Philadelphia:

"Our molders work 9 hours per day, the number of molds depending entirely on the job. Our regular wage is $3 per day. Where a molder can show more and better work than the usual, his pay is increased accordingly. I might add that we find this an excellent stimulant, and as we have an open shop there is no intereference with the plan."

In Buffalo, N. Y., the pay of molders is at the rate of $3 per day, and they work from 7 o'clock in the morning to 5 o'clock in the afternoon, with ½ hour for lunch.

We learn from a large Cleveland, O., concern casting

brass, bronze and aluminum that in that plant they run 9 hours a day, and in their Buffalo and Detroit plants 10 hours per day. The molders have a half hour for lunch, and quit molding half an hour before time, using this last half hour to pour off, and riddle their sand, so as to be in shape for the following morning.

In Pittsburg, the molders work 9 hours per day for $3.30, and the number of heats is governed by the class of work.

We have received the following from one of the largest foundries in Chicago:

"In reply would state that it is a bit difficult to furnish information in such a case as you mention that would be of any value. Our molders work about the same number of hours, namely, about 8, and pour from three to five heats, according to the acquirements of the particular molder, and number 60 crucibles; that is, on a line of goods such as we regularly manufacture. In a special line some of the molders pour two heats, others three. Some number 40 crucibles and some number 80."

From the above very meager data it would appear that the wages of brass molders varies very little even in widely separated sections. The hours vary from 8 to 9 and the wages from $2.50 to $3.50, the former being the compensation offered by our Michigan correspondent and the latter by our Pittsburg friend. Hartford pays $3 for 8 hours work, which is the highest rate mentioned. Some foundries pay on the number of molds and not on the time; this will work when the patterns are repeated, but would be troublesome for the ordinary jobbing shop where the kind of work is not known until the pattern enters the shop. Comparisons are difficult where the conditions are so difficult, and the matter above is presented and left so that each founder can form his own conclusions.

DIRECT CASTING WITH INGOT METAL.

We desire to call particular attention to an article presented in another column on "Brass and Bronze Ingot Metal," written by John G. Neiderer. Mr. Neiderer discusses the merits of ingot metal from the standpoint of the expert, and he proves his contention by the exhibition art castings which are absolutely perfect in every respect. The two specimens of Mr. Neiderer's work, of which we present engravings, are without flaw; the surfaces of both are without blemish and the texture is exceedingly fine. Both the horse and tray were cast from ingot metal—the first bronze and the other yellow brass.

General foundrymen and art metal workers are beginning to recognize the fact that ingot metal has passed beyond the experimental condition. The best makers of alloys long ago became convinced that if they expected to get and hold their trade they must adhere strictly to their formulas; their percentages must be correct and their duplication of orders, whether separated by an interval of a week or a year, must be accurate. This they have learned to do and they have proved themselves willing to comply with the requirements of their customers.

The founder who knows he can get the mixture he wants will not trouble himself to make his alloy, unless compelled to do so by exorbitant prices. When doing his own mixing he is constantly more or less in the dark as to the results, since he has to depend upon others for the various metals he uses in the mixtures. If he so desires he can establish an analytical bureau of his own and test every lot of metal he receives; but he is not anxious to do this.

We think the cause for the feeling of distrust some founders have for ingot metal arises from the fact that some years ago the manufacturer of metal insisted upon making and trying to sell to the founder a mixture he did not want, but something that was just as good. The same course has been followed in every industry and with the same result—the founder did his own mixing. We think Mr. Neiderer's solution of the difficulty the true one; place your orders with a strictly reliable metal dealer, stating what you want and the business will be sure to be conducted without any trouble. In spite of trusts and sharp dealings, business is now largely done upon a foundation of honesty, and this applies as pertinently to the metal dealer as to any other.

SOLDERING PREPARATIONS IN ITALY.

Vice-Consul Ernest Santi, of Milan, Italy, sends a report to the Bureau of Manufactures on the correct way to introduce American soldering preparations into Italy. He states that while many different mixtures are used in that country at the present time, they are nearly all primitive. There are some patented articles on the market, but they do not seem promising, as the Italian user in general would rather use a mixture containing muriatic acid, which he has always used, than risk novelties. The success of the American article depends on its price and its results, and to exploit it correctly on the Italian market the American firms must send a full line of samples to each user with directions for use, together with prices and terms of sale. Italians should be induced to try the article at the expense of the American firm, and instructions for use should also be given. The Italian consumption of these goods is not very great, but it is large enough to be worth while of some American firm to establish a good business in Italy after the various consumers have tried the soldering preparations and they have proven satisfactory in every way. Solder wax in sticks pay $1.93 duty per 220 pounds entering Italy, and wrappers or cardboard boxes containing them pay separately $13.51 per 220 pounds.

An American consular officer in South America reports to the Bureau of Manufactures that brass beds seem to have a better sale than iron ones in the country in question, and it appears that brass beds could be imported to advantage.

The Treasury Department holds that various articles, such as chatelain neck chains and charms, are properly classified as jewelry.

The cause of porosity in castings has been found, and the soundest castings are now possible by the use of deoxidizers, such as silicon, phosphorus, aluminum, or magnesium.

CRITICISM AND COMMENT
WE CORDIALLY INVITE READERS' OPINIONS AND CRITICISMS OF ALL ARTICLES
PUBLISHED IN THE METAL INDUSTRY. SUGGESTIONS WELCOME.

SHEET COPPER FOR ROOFING, CORNICE AND LEADERS.

To the Editor of THE METAL INDUSTRY:

It is almost impossible for us to give you any data that would be at all accurate in relation to the amount of copper used for roofing and cornice purposes. A large percentage of the copper used nowadays for roofing and cornice purposes, as well as for leaders, is supplied in the form of rolls, and there is no available means of ascertaining what the production of this copper is. Some two or three years ago the production of sheet copper was in the neighborhood of 25 to 30 million pounds per month. We had some way of getting at the figures then, but the output has no doubt increased considerably since that time. This does not take into consideration the amount of copper produced in the form of rolls. A great deal of sheet copper is used by manufacturers of teapots, coffee pots and wash boilers, and the poundage in this direction is very large. We doubt if more than 40% of the sheet copper output is used for roofing, cornice and leader purposes.

Very truly yours,
The Ansonia Brass & Copper Co.,
R. A. COWLES, Treas.

SPONGY CASTINGS.

To the Editor of THE METAL INDUSTRY:

We are in trouble with our castings for gold plated work. Our standard is very high and we cannot send to the plating department any castings which are not absolutely perfect. The least sponginess is barred, and any surface cracks prevent a proper gold finish.

T. I. F. COMPANY.

(This letter we submitted to our experts with the following results: The matter referred to is found in almost every foundry to a more or less extent. The trouble arises from many causes and can only be overcome by constant watching at all stages of the process. Sometimes the melting temperature is wrong or there is a concentration of the gases resulting from imperfect venting of the molds; and again oxidation may be at the bottom of the trouble. In some foundries oily waste is thrown upon the metal when pouring to prevent oxidation.—C. H. P.

In regard to sponginess, the metal ought to be remelted. Thorough poling with green hickory poles, so as to refine the metal before pouring, will also prove useful. A very small amount of silicon-copper might be added. Much depends on the molding sand and for such high grade work French molding sand could be doubtless used to advantage.—J. L. J.)

To the Editor of THE METAL INDUSTRY:

We would like to know whether it would be possible to tell from an analysis the exact proportion of a composition, say one that contains four different metals. To make ourselves plain what we want to know is if it would be possible for anyone to have an analysis made of a composition and from that analysis be able to duplicate the metal with the assurance of getting the exact mixture.—BRASS COMPANY.

September 7, 1907.

We would refer you to an editorial upon this subject which appeared in our issue of August, 1907, under the heading "Secret Alloys—Analytical and Synthetical Chemistry." An analysis can be made of any brass or babbitt and the exact composition obtained. The duplication of any alloy after you have the analysis depends upon the duplicator's experience and metallurgical knowledge. After he has the analysis he has to put the metals together properly. A hardener may be necessary or various fluxes—so that it is evident that considerable gray matter must be mixed in with an analysis in order to obtain results.—Editor.

SILVERITE ANODES.

To the Editor of THE METAL INDUSTRY:

We are platers, and are interested in anything new in the way of anodes. We noticed the account of Zucker & Levett & Loeb Company's Silverite anode on page 237 of your August issue.

The illustrations there show the "Silverite" anode in the original form, and also after being used some seven months. We can't understand, and would like to know what caused the "hooks" of this anode to move outward —you will note that the hooks on the "used anode" are away out on the edge, while on the "original" they are nearly on top of the second tooth, or possibly two inches from the edge where they show on the "used anode."

In looking over this item of anodes, we noticed the above, and decided to write for an explanation as to the hooks being in a different place on the used anode from what they are on the original.

September 26, 1907. FRANKLIN SPECIALTY CO.

This matter was referred to the Zucker & Levett & Loeb Company, who replied as follows:

Gentlemen:—

We thank you for your valued favor of the 27th inst., enclosing letter from Messrs. Franklin Specialty Company of Reading, Pa. We would explain the apparent phenomenon of the hooks on the top of our Silverite anode moving after the anode has been in use by saying that the cut of the *unused* anode shows the anode as we make it now with the hooks nearer the center than we formerly made it. This change was made simply to facilitate casting of the hooks.

The cut of the *used* anode shows the anode as it was formerly made when we first made this style anode and where the hooks were near the outside edge.

We are glad your clients called our attention to this, as it will appear strange to any one not knowing the circumstances, but as a matter of fact the hooks do not move. It is simply the electro of the used anode was an electro of one of the first anodes which we made, while the way we make them now the hooks are nearer the middle. ZUCKER & LEVETT & LOEB CO.

September 27, 1907.

The best brass rolling alloys are the Tombac alloys, containing from 75% to 85% copper. Only the purest metals can be used in making them. They are mostly used for cartridge cases and high-class ornamental brass work.

CORRESPONDENCE

IN THIS DEPARTMENT WE WILL ANSWER QUESTIONS RELATING TO THE NON-FERROUS METALS AND ALLOYS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

METALLURGICAL.

Q.—How much lead will yellow brass stand to the pound of copper and still have it mix thoroughly; also, what effect does the lead have on the color and will the lead tend to harden the metal?

A.—Under ordinary conditions a brass mixture may contain, without the lead separating, from 3¾ to 18½ per cent. With all new metal and on the first melt there might be a separation, even with the lowest amount named, due to imperfect alloying. Where a large amount of lead is carried without separation there is always some metal like iron or antimony present that prevents the separation. With a high percentage of lead the alloy becomes whiter and its ductility is lessened so that it machines very easily.—J. L. J.

Q.—Please let me know the cost of running a small foundry to cast from 50 to 100 pounds of brass a day.

A.—It would hardly be profitable to operate so small a foundry as the one to which you refer unless it could be done in connection with an iron foundry and about two heats per week taken off. The cost of operation would depend on the price of copper, cost of labor, etc., and might be roughly stated at $25 per week. There are many small shops where the proprietor is molder, melter and machinist, and where scrap brass is bought up at a low figure. In this way costs may be kept very low.—J. L. J.

Q.—Will you kindly let me know how to make iron soft in sand molding?

A.—To soften hard iron, melt very hot, using plenty of coke and add 1 pound of 50 per cent. ferro-silicon to each 100 pounds of iron, making the addition to the melted iron in the ladle before pouring.—J. L. J.

Q.—Kindly let me know how to make nickel anodes, the kind of crucibles, etc.?

A.—The mixture used by many anode makers consists of cast iron 5 parts and nickel 95 parts. Cupolas with high pressure blast and dry sand molds are used by the larger makers, although other forms of special crucible furnaces supplied with air by a fan and using coke fuel have proved satisfactory.—J. L. J.

Q.—Can you give us any information in regard to the making of nickel anodes, what the alloy consists of, kind of crucibles used, and any details which would be of value to us?

A.—In melting nickel a graphite crucible is absolutely necessary owing to the high temperature required. As a flux fluor spar and lime are used mixed in equal proportions with water and allowed to dry. The anode alloy consists of nickel, iron and tin, according to the percentage of the anode. In melting your scrap use about 3 pounds iron and 2 pounds Straits tin in each 100 pounds of scrap; this should give you a good anode, white and soluble.

Q.—In connection with our work we have a lot of German silver scrap from sheets, called about 17 per cent. in the trade. We use this for remelting, for casting German silver fittings, and find if poured in too cold the metal is porous. If poured too hot it comes very rough, and we find it difficult to get just the right temper for finishing. Can you tell us what to do with this metal to make it cast as it should?

A.—If you will first run the scrap down into ingots and add 8 ounces of zinc and 2 ounces of aluminum and then remelt, the castings would come out all right. If the sheet is very light somewhat more aluminum may be used, but a large excess is to be avoided.—J. L. J.

MECHANICAL.

Q.—How far can automatic cock and valve grinders take the place of hand grinding?

A.—The name "automatic" cock grinder is misleading, for no machine can be called automatic that requires the operator to handle each piece of work, as is the case with cock grinders. Semi-automatic would be more appropriate. On small, plain work a four-spindle grinder can be called upon to save from 50 to 75 per cent. of all the cost of hand grinding, and the same percentage of time; but in large work, where the grinding must be perfect (steam work especially), there is not enough difference in cost to make their employment worth while.—W. H.

PLATING AND FINISHING.

Q.—Am having trouble in plating repair work, especially on large pieces where the silver has been buffed off it will not take the new plate. The work I am doing is table ware made of white metal. Knives, forks and spoons I have no trouble with—in fact, I have no trouble in any of the work except the few large parts in each table set. How long should the quickening solution go without replenishing? My silver solution is a nitrate one; could I add chloride of silver to it?

A.—It would be advisable for you to rig up a small cyanide of copper solution to first coat the articles you have trouble with; they would then very easily take the mercury. A solution consisting of 3 ounces of carbonate of copper, 5½ ounces of cyanide and 2 ounces of bisulphite of soda to each gallon of water would answer your purpose. As long as you get a good clean deposit of mercury water is only necessary to take care of evaporation; regulate with your Baume hydrometer. Chloride of silver or cyanide of silver should be used. Nitrate solutions are not satisfactory with Britannia ware, although many platers get good results with these solutions on steel.

Q.—We would appreciate a formula for depositing gold, silver and copper on glass.

A.—We would refer you to an article in the January, 1907, issue of THE METAL INDUSTRY for an article by Joseph Dimes entitled "Silver Deposit on Glass and Porcelain," and also to an article on the "Deposition of Gold, Silver and Copper on Non-Metallic Surfaces," by Edward E. Newton in our issue for May, 1906.

Q.—We would like to know the method of producing a sand blast finish on iron and brass for builders' hardware.

A.—We are sorry to inform you that it is impossible to produce the sand blast finish upon iron and brass with the aid of dips. The best imitation is to use the rough sand surface. After plating and oxidizing produce your relief work with a brass scratch brush and powdered pumice stone. By this method good imitations of sand copper and brass can be produced.

Q.—Please let me know how to make a good brass solution so that the deposit will stand polishing.

A.—See article in the June number, 1907, of THE METAL INDUSTRY on preparing brass, copper and bronze solutions. You cannot copper plate iron in a dip so that it will stand dipping in the regular acid dip. You can copper color iron by using a solution consisting of 2 ounces sulphate of copper and ½ ounce sulphuric acid to the gallon of water. A good mercury dip can be made by dissolving ¼ ounce yellow oxide of mercury and 2 ounces cyanide in each gallon of water. From 4 to 6 volts pressure is needed in brass plating.

Q.—We have an inquiry from our people to oxidize razor backs, and we should like to know the best way of doing it.

A.—To retain the temper of the razor it is not possible to oxidize with heat. The best method then would be to copper the backs of the razors with a solution of 2 ounces of sulphate of copper, ½ ounce of oil of vitriol and 1 gallon of water. Use a sponge and rub over the backs with the copper solution, which will give you a coat of copper. Now use chloride of platinum mixed with alcohol to produce a black, using a sponge also for this purpose; or use a solution of ammonium sulphide, 2 ounces to the gallon of water in the same manner. Either solution will oxidize. Afterward rub with a soft cloth and lacquer with a camel's hair brush.

Q:—(1) Please give me a formula for platinum black on sterling silver, also (2) how to dissolve platinum and (3) a good brass solution.

A:—(1) Platinum black as used upon sterling silver or plated ware consists of 2 parts chloride of platinum and 1 part chloride of iron dissolved in 3 parts grain alcohol—denatured alcohol will answer the purpose. The articles are heated and the platinum mixture applied with a camel's hair brush. (2) Platinum chloride is produced by dissolving metallic platinum in aqua regia which consists of 3 parts muriatic acid and 1 part nitric acid. Dissolve with the aid of heat, using sufficient platinum to produce a solution, when evaporated, of the consistency of syrup. A little of the metal platinum should remain undissolved, as that will always insure a concentrated solution. (3) See Charles H. Proctor's idea for a standard solution in our June, 1907, number. The copper solution can be used as a base for brass and bronze solutions, also C. P.

Q.—(1) Please publish an acid copper that will work without the aid of a battery. I want this to use on brass badges. (2) I would also like a good silver solution—one that I can do heavy depositing with.

A.—(1) Dissolve 1 pound of sulphate of copper in 1 gallon of water with the aid of heat. When cool add 3 ounces of oil of vitriol and mix well. Cleanse your brass badges in any of the usual ways and immerse in the solution, supporting the articles by iron wire. A minute immersion will give a copper coating; the longer the immersion the thicker the deposit. (2) For heavy deposits of silver you will have to use a battery or dynamo. Two ounces of chloride of silver and 4 ounces of cyanide of potassium in 1 gallon of water will give you a fairly good solution.—C. P.

Q.—We are using an acid ormolu dip with which, up to the present, we have been very successful. But of late some of the spinnings which we have tried to mat have turned almost dead black, while other pieces have acted in the usual manner. Can this be the fault of the metal? If not, can you enlighten me as to what it might be?

A.—It appears to us the trouble must be in your metal. If your dips produce some of your work in a satisfactory manner, it surely cannot be the fault of the dip. It must be due to some impurity in the metal, unless the sulphuric acid you used got contaminated with iron in some way. This might have caused the trouble.—C. P.

Q.—Can you give me any information on the installation and management of japanning rooms?

A.—We presume you refer to baking japanning. There are three methods now in use: The first is the brush japanning and for fine work this is rubbed down, the ornamentation applied and then varnished. The ordinary dipping method accomplished in one, two or three dippings, and baking, and the tumbling barrel method. The latter is for small articles and is both air drying and baking. It would be advisable for you to obtain the services of a practical japanner and let him work the details out for you.—C. P.

Q.—I am sending you under separate cover a sample of bronze plate on a piece of brass casting. I would like you to tell me the best way to obtain this finish.

A.—The sample submitted is not plated, but only colored upon what is known as extrusion metal consisting of 54 parts copper and 46 parts zinc. You can produce the color desired by preparing a solution consisting of the following: Nitrate of potash 2 ounces, yellow sulphide of antimony ¼ ounce dissolved in 2 ounces water ammonia, 26%, and water 1 ounce. This is used warm. Clean your brass work in the usual manner and then scratch brush, using a little pumice stone powdered, to produce a dead lustre. Immerse for a few seconds in the solution, dry out with the aid of boiling water and sawdust; afterwards scratch brush lightly; this will produce the color. Afterward lacquer by brush or dip.—C. P.

Q.—Kindly publish a good bronze solution, also how to produce that brown color on bronze.

A.—If you first prepare a copper solution consisting of the following formula, and afterwards add carbonate of zinc dissolved in water in the proportion of 1 part zinc to 2 parts of cyanide you will be able to produce a bronze solution of any desired shade:

Water	1 gal.
Red copper compound	2 ozs.
Bisulphite of soda	2 "
Cyanide of potassium	6 "

Use the solution warm. Use anodes consisting of 90 parts copper and 10 parts zinc. The brown color on bronze can be produced by dissolving 2 ounces nitrate of potash in each gallon of hot water, then add ¼ ounce yellow sulphide of antimony dissolved in 2 ounces water ammonia and mixed with the nitrate of potash solution. Cleanse and immerse your articles. A few seconds in the hot bath will produce the brown. Dry out carefully and scratch brush with a soft brush; afterward lacquer.—C. P.

(1) Please tell me the advantage of adding salt to a pickle, also (2) what is the advantage of dipping copper in hot argol solution?

A.—(1) By the addition of salt (sodium chloride) to the regular acid dips for bronze and copper, chlorine is formed by the action of the sulphuric acid, which assists in attacking the surface of the metal more rapidly and evenly and produces a brighter lustre. (2) The advantage of using a hot solution of argol or crude cream of tartar is to prevent oxidation which usually occurs upon copper or bronze very rapidly after acid dipping. A hot solution of plater's compound, 2 ounces to the gallon, can be used for this purpose and will give better results than the argol solution.—C. P.

Q.—Am interested in bronze work and saw a compound to rub on bronze which would give it an old look and would not fingermark by handling.

A.—We do not know who prepares such a compound as you refer to. You can produce a similar effect by dissolving beeswax in turpentine with the aid of heat to the consistency of a thin shoe polish, and while warm mix in a little hydrosulphuret of ammonium, according to the depth of tone desired. By rubbing a little of this mixture upon brass or bronze work when clean an old effect will be produced. The wax coats the surface and protects it; finger marks will not show.

Q.—We are in receipt of your sample of green finish on bronze and in reply beg to state that we are very much pleased with the same. The distinct green color you have produced is just the effect we desire.

A.—To produce the finish same as sample proceed as follows: All parts to be finished should be cut down with tripoli (a high color is not necessary), then cleanse in the usual manner as for plating. Then prepare a solution consisting of 2 ounces sulphate of copper in each gallon of hot water, using sufficient solution for your purpose. Immerse the articles for a few seconds and the green will appear. Dry out in the regular way and then relieve to show the brass, either with a small felt wheel and tripoli, or small buffs coated with 100 or 120 emery. Wash in benzine, dry out in maple sawdust and lacquer with a good body lacquer in the usual manner.

Q.—(1) We wish to make a tumbling barrel for polishing small pieces of brass, copper and steel. Would it be practical to make same of boiler iron and have three ridges on the inside so the articles will be continually dropped? (2) Also would you advise using small steel balls with borax water?

A.—We are of the opinion the barrel you suggest would not prove satisfactory. The idea of a tumbling barrel is to roll. The finishing is accomplished by the friction of one article against another. It would be more advisable to construct a barrel with a number of small ridges 1 or 1½ inches high; this would cause a better change of position of the work and would avoid pounding. (2) Small steel balls and borax water are being used very successfully in polishing small articles of brass, copper and steel.

Q.—(1) My nickel solution is not working right; the work is coming out hard, rough and dark colored. Blue litmus paper shows plenty of free acid. I put in liquid ammonia and am afraid I put in too much. The color of the solution has changed from green to blue and the plate is softer. The hydrometer stands at 6½. (2) I notice some of my anodes are black and soft and a yellow sediment collects on them. Should this be scraped off?

A.—(1) In the first instance your nickel solution needed metal. If you had added 2 ounces of single sulphate of nickel to each gallon of solution the metal content would have been reimbursed and the trouble you relate would not have occurred. The addition of ammonia is a frequent cause of trouble to nickel platers. As long as the nickel solution conducts freely single sulphate of nickel is preferable, as it gives you the metal needed. Only when the solution shows dark streaks or shadows is it necessary to add conducting salts, and then a little common salt will answer the purpose. If your solution does not work properly reduce it to 5 degrees Baume and then add 2 ounces single sulphate of nickel to each gallon; this will change the color and should give a normal bath. (2) You should occasionally boil your anodes and scrape them; this gives your solution a chance to reduce the metal properly.

Q.—We are plating steel strips, as follows: First, in an electro-cyanide-copper carbonate bath, with copper anodes. Second, in an electro-cyanide-brass bath (copper carbonate and zinc carbonate) with brass anodes. Our only object in copper plating these is that we find a deposition of copper underneath the brass fills up any small holes and helps prevent rust. Now, I am confident that for a priming layer of copper the cyanide bath is altogether too expensive, and wish you to suggest something to take its place. How about a copper carbonate solution, with oil of vitriol, and no electricity or anodes? Is not that the way wire is coppered? Would a primary bath of acid like that, if strips were properly washed, affect my brass bath? I hope you can suggest a covering that will accomplish the purpose mentioned, and do it without the expense of cyanide and electricity.

A.—Deposits by simple immersion are nothing more than a film. If you find the method you are now using unsatisfactory you might try the copper immersing process. This is the method used in copperizing iron and steel wire. After copperizing it is redrawn through the die to give it the lustre noted. The method used for the purpose, and which you might try, is to prepare a solution consisting of:

Sulphate of copper	3½ ozs.
Oil of vitriol	3½ "
Water	2 gals.

Use this cold. First dissolve the copper salt in a little boiling water, then add the balance and the acid. Cleanse the work in the usual way. Pass through the dip very rapidly; re-wash in water and proceed in your regular manner. This deposit can be slightly oxidized and scratch brushed without showing the iron beneath.—C. P.

Q.—I've had trouble with my cyanide-copper bath. I could not get a good red deposit and the work began to peel and blister.

A.—Your solution evidently contains too much free cyanide for your purpose. After working several days you noted an improvement in the bath. This would prove this, because by continued action the free cyanide would decompose or lose some of its strength, and by absorbing metal from the anodes become more normal. Add cyanide sparingly when plating iron or steel. A faint bluish tinge, showing the solution contains very little free cyanide, will prove most satisfactory for your purpose. Occasionally add a little bisulphide of soda to your bath; this will cause a good red copper to be deposited.—C. P.

METALLURGICAL DIGEST

A REVIEW OF METALLURGICAL MATTERS OF THE WORLD.
TRANSLATED AND EDITED BY HOWARD GREEN BAYLES, MET. E.

GIVING COPPER A BROWN COLOR.

In response to an inquiry, several correspondents of *Der Metallarbeiter* have submitted methods of browning copper, all of which have been tried and found satisfactory in actual practice:

(1) Neutralize a half pint of 20% ammonia with acetic acid. Add a half ounce of sal ammoniac. Dilute to a quart with water. Moisten the surface of the copper article with this solution and rub dry with a rag. Repeat until the desired color is produced.

(2) One ounce of sal ammoniac and one-third ounce of oxalate of potash are dissolved in a half pint of vinegar and the surface of the copper rubbed with this solution.

(3) The Chinese method of browning copper is to mix 2 parts crystallized verdigris, 2 parts cinnabar, 5 parts sal ammoniac and 5 parts alum. These are crushed and ground together until intimately mixed. Enough water or vinegar is added to make a paste and this is applied to the surface with a brush. The copper article is then heated for a short time over a coal fire. After cooling it is thoroughly washed and rinsed. The process may be repeated if necessary. By adding a little copper sulphate (blue vitriol) a chestnut brown color may be produced and by the use of a little borax a more yellowish color will result.

(4) To brown solid articles, such as castings, over their entire surface mix together equal parts of powdered verdigris and powdered sal ammoniac. Add to this enough vinegar to make a paste. As needed for current use take of this paste about 2½ ounces and mix it in a kettle with a pint of vinegar and two to four quarts of water. Boil this mixture for five minutes. The copper article is immersed in this bath until the desired color is produced. As soon as this point is reached remove the article and dry it by means of heat.

(5) Another method is to provide an iron vessel with a cover which may be made steam tight and which has a grate or rack of tinned iron an inch or two from the bottom. Sal ammoniac is sprinkled on the bottom, the copper article is supported on the rack, the cover is made tight and the vessel is heated on a stove or over a fire. Hot coals should not be directly in contact with its bottom. A vapor of sal ammoniac is produced inside the vessel, which in a very few minutes gives the copper a strong red color. By subsequent rubbing with a paste of sal ammoniac and water this color may be darkened to brown or even black.

(6) A solution is made in water of one part chlorate of potash and two parts blue vitriol. This is heated to 140 or 150 degrees F. and the copper article is immersed until colored to the desired point. It must then be quickly removed and washed.

"TINOL."

Tinol is a patented preparation which should simplify one class of special work that many metal workers are called on to do from time to time—namely, the tinning of metal articles. For very heavy coatings the old sweating method cannot be improved on and for a regular output of tinware or tin plate the dipping methods are quite satisfactory. Tinol, however, involves no machinery nor even the use of the large quantity of melted metal that is necessary for dipping an occasional piece. It is a ready-to-use preparation which is applied with a brush to the surface to be tinned. The article is then heated until a metallic gleam appears on its surface; in other words, to the point of fusion of tin, and then wiped with a greasy rag.

Tinol is made by the Firma Kuppers Metallwerke G. m. b. H., Bonn am Rhein. There are seven different alloys prepared in this way for giving surfaces of tin, brass, nickel, etc. The price depends on the fluctuating prices of the metals, ranging at present between 35 and 70 cents a pound. A letter addressed to the manufacturers would no doubt bring full literature and very likely samples as well.

INFLUENCE OF VARIOUS METALS ON THE WORKING QUALITIES OF ALLOYS.

Der Metallarbeiter continues its series of excellent articles on the influence of various metals on the working qualities of alloys. The second takes up German silver, giving the following analyses and the particular qualities of each:

	Zinc.	Copper.	Nickel.	Lead.	Tin.	Cadmium.
(1)	20 parts	60	25			
(2)	25 "	50	25			
(3)	26 "	60	15			
(4)	48 "	60	15			
(5)	23.7 "	55.8	13.4	3.54	4.0	
(6)	5.6 "	69.9	19.8			4.7

(7) Copper, 65.2; nickel, 13; zinc, 19.5; silver, 2.05; iron, .12.

Nos. 1 and 2 are especially good for rolling; No. 3 has a yellow color; No. 4 is very easily fusible. The last three are all departures from German silver proper, the additions being added to make a metal that will give good castings.

The third of the series takes up the tin alloys, classed broadly as white metal and Britannia. Three bearing alloys that are in regular use by large German firms are:

	Tin.	Antimony.	Copper.	Lead.
(1)	83	11	6	
(2)	82	12	6	
(3)	42	16	2	40

The first two of these are adapted to railroad use, while the third is suitable only for lighter work.

Three Britannia alloys are given as follows:

	Tin.	Antimony.	Copper.	Zinc.	Arsenic.
(1)	90.6	7.8	1.46		
(2)	93.7	9.4	.03		
(3)	85.6	9.6	.08	.3	.8

The first two are excellent for stamping or rolling, while the third is brittle and utterly unserviceable.

The fourth and last article discusses bronzes. Additions of tin to copper up to 5% practically double both its hardness and strength. Further additions up to 20% increase its hardness, but make it more brittle. Between 20 and 65% of tin the bronze remains almost unchanged, except as to color. Above this point both hardness and strength fall off rapidly.

Additions of aluminum to copper increase its hardness and srtength. At 5% the strength is two and one-half times that of pure copper and at 10% about four times. This percentage gives the maximum. Aluminum bronze has a beautiful gold color and with 9 or 10% oxidizes very slowly, being almost the equal of gold in this respect and much superior to brass. Aluminum has also the property of removing the oxygen which is likely to weaken castings of copper alloys and making them sound.

Tin decreases the forging qualities of copper. For cold work it should not exceed 6%; for rolling at a low red heat it may contain 15% and at a dark, cherry red 18%.

A bronze of 20% tin may be softened and annealed by heating to a dull red and quenching in water. Additions of zinc make bronze easier to cast and lead makes it softer and more ductile. A tough bronze may contain 12 to 14% tin and 2 to 3% zinc. A good alloy for journals contains 9.5% tin, 9.5% zinc and 7.5% lead. Art bronze is best made the same as the tough alloy just given. Where a patina is to be given it as finish too much zinc and any arsenic at all are fatal.

A bronze containing 10% of tin is increased 30% in strength by the addition of 1/10% of phosphorus. This is introduced by adding 2 to 3.5% of 9% phosphor-copper to the alloy in the ladle. Part of this phosphorus will be unavoidably burned out, leaving about the desired amount. Too much is worse than none, however, making the bronze brittle and unworkable.

Le Journal de l'Electrolyse gives the total world production of aluminum for 1904 as 9,300 long tons; 1905, 11,500 tons; 1906, 14,500 tons, and estimates the output for 1907 at 20,000 tons.

Associations and Societies

REPORTS OF THE PROCEEDINGS OF THE METAL TRADES ORGANIZATIONS.

AMERICAN BRASS FOUNDERS' ASSOCIATION—CONSTITUTION.

ARTICLE I.

NAME AND OBJECT.

Section 1. The name of this Association shall be the American Brass Founders' Association.

Section 2. The object of this Association shall be solely educational, and shall be accomplished by the collection of such information as will be of benefit to the members and to general shop practice; by the presentation of papers on appropriate subjects; and by the publication of such literature as may be deemed expedient.

ARTICLE II.

MEMBERSHIP.

Section 1. The membership of this Society shall consist of two classes, to be called, respectively, active and honorary members.

Section 2. The following shall be eligible to active member ship:

Producers of any of the non-ferrous metals or their alloys; producers of manufactured goods from such metals or alloys; manufacturers of supplies used by producers of non-ferrous metals and metallic goods; and persons holding positions of responsibility with the producers and manufacturers above described.

Section 3. Any person whose knowledge or services are preeminently valuable to the Society may be elected an honorary member.

ARTICLE III.

OFFICERS.

Section 1. The officers of this Association shall be a President, a Secretary, a Treasurer, and ten Vice-Presidents. These officers collectively shall constitute the Executive Board of the Association.

ARTICLE IV.

CONVENTIONS.

Section 1. The time and place for annual conventions shall be decided upon by the Executive Board of the Association; but they shall be held at the end of May or the beginning of June.

BY-LAWS.

DUTIES OF OFFICERS.

Section 1. The officers of the Association shall be elected by ballot at the annual meeting (a majority of those voting being necessary to elect), and shall hold office for one year, or until their successors shall have been chosen.

Section 2. The officers elected shall assume their duties on July 1, which shall be the beginning of the fiscal year. In case a vacancy should occur in any office during the year, the Executive Board shall fill the vacancy within one month from the time it occurs, to complete the unexpired term.

Section 3. The President shall have general supervision over the affairs of the Society, shall preside at all meetings, and shall perform such other duties as usually devolve upon a presiding officer.

Section 4. The Vice-Presidents in the order of the districts as printed shall perform the duties of the President during his absence or in case of a vacancy in said office.

Section 5. The Secretary shall be under the direction of the Executive Board of the Society. He shall conduct the correspondence of the Society, and shall keep a complete record of all members. He shall see that moneys due the Society are carefully collected and transferred to the custody of the Treasurer. He shall carefully scrutinize all expenditures, and use his best endeavor to secure economy in the administration of the affairs of the Society, and shall furnish at the annual meeting a written report of the year's proceedings.

For his services he shall receive such compensation as may be decided upon by the Executive Board.

Section 6. The Treasurer shall have charge of all moneys and pay all bills which have been approved for payment by the President. He shall keep regular accounts of all receipts and expenditures, and shall report at the annual meeting.

DUES.

Section 7. The annual dues of active members shall be five dollars ($5.00) payable in advance.

Section 8. No dues shall be collected from honorary members.

PROPOSED NATIONAL ASSOCIATION OF PLATERS AND POLISHERS.—From one of the many letters received by Charles H. Proctor, of Arlington, N. J., who has taken so great an interest in the formation of such an association, we quote as follows:

"In the August issue of THE METAL INDUSTRY I notice you have an article to the 'Platers and Polishers of the U. S.' I would say that I would like to become a member, if possible, of such an association as you name. I started in this business of plating and polishing two years ago, and although experiencing trouble at times, THE METAL INDUSTRY always had 'trouble articles' that fitted my case and set me right. In my opinion such an association as is proposed would bring the platers and polishers together and would be of the greatest benefit to all concerned. I hope the association will be formed."

THE AMERICAN ELECTROCHEMICAL SOCIETY. The 12th general meeting of this society will be held October 17 to 19 in New York City, the opening session being at the Chemists' Club, 108 West 55th street. The morning session of October 19 will be held in Havemeyer Hall, Columbia University. The hotel headquarters are at the Hotel Cumberland, 54th street and Broadway. On the afternoon of the 18th an excursion will be made to the laboratories of Thomas A. Edison. Among other papers the following will be presented: Diamond and Moissanite: Natural, Artificial and Meteoric, by Dr. Geo. F. Kuntz; Defloculated Graphite, by E. G. Acheson; The Electrometallurgy of Zinc, by Mr. Gustave Gin; Electrolytic Separation of Silver and Copper, by H. W. Gillett; Electrolytic Determination of Minute Quantities of Copper, by E. E. Free.

ASSOCIATED FOUNDRY FOREMEN. President, James F. Webb, Elkhart, Ind.; secretary-treasurer, F. C. Everitt, Trenton, N. J.

This association has presented the first number of its Associated Foundry Foremen "Review," which is a monthly journal devoted to papers read and discussed at the meetings of the local associations. This journal presents the papers read before local organizations and is intended to give all members of foundrymen's associations the benefit of papers and discussions read before local associations. The "Review" before us contains the following papers:

The Foundry Foreman, by Charles J. Goehringer, read before the Cincinnati Foundry Foremen's Association. Another paper before the same association was by W. G. McIntosh, on British Foundry Practice. There is a paper on Semi-Steel Castings, by David McLain, of the Milwaukee Foundrymen's Association. In addition the "Review" presents items of general interest to foundrymen all over the country.

AMERICAN FOUNDRYMEN'S ASSOCIATION. President, Stanley G. Flagg, Jr., Philadelphia, Pa.; secretary-treasurer, Richard Moldenke, Watchung, N. J.

The Cost Committee has completed its work and the report will be issued soon, in fact, in advance of the convention. The Executive Board will take up the work for the coming winter, which will most likely be the inaugurating of experimental work by the association, in solving pressing problems of the foundry.

Through a typographical error the address of J. A. Gutsche as a member of the American Brass Founders' Association was stated to be Philadelphia. His correct address is J. A. Gutsche, 682 E. 102d street, Cleveland, Ohio.

ITEMS OF INTEREST TO THE INDIVIDUAL.

A. J. Passino has taken the position of general manager with the Brady Brass Co., at Jersey City, N. J., formerly occupied by Mr. Reubens.

F. E. Lonas, of the Maywood Foundry & Machine Co., 80 Wall street, New York, has just returned from a 7 months' business trip to Europe.

L. M. Pignolet, of 78 Cortlandt street, New York City, manufacturer of ammeters and voltmeters, has recently returned from a trip to Europe, combining both pleasure and business.

Charles E. Scofield, with Merchant & Evans Co., Inc., and Arthur Seligman, has been elected to membership in the New York Metal Exchange at the meeting of the board of managers.

Fred. W. Allen, of the firm of Barker & Allen, Ltd., German silver manufacturers of Birmingham, England, is on a two months' visit to the United States and Canada. He is traveling in the interest of the rolling mill and will call at the principal cities in the eastern part of the country.

DEATHS

Walter G. Cotton, president of the American Tube Works, Boston, Mass., died suddenly September 9, at his home in Longwood.

David P. Tompkins, of Geneva, N. Y., died at his home on September 8. Years ago Mr. Tompkins was associated with his father in the manufacture of tin ware, and later in the retail business. He had been in good health for many years and led a retired life. His widow, two daughters and one son, survive.

Charles L. Nesler, a veteran manufacturing jeweler of Newark, N. J., died at his home there, at the age of 76. He was in the jewelry business a half century, and was one of the oldest masons of Newark. He was born in Eddyville and went to Newark in 1846. He leaves a widow, three sons and a daughter.

Austin B. Fisher, founder of the brass manufacturing firm of A. B. Fisher Company, of Brooklyn, N. Y., died on Monday at his home, 774 Hancock street, Brooklyn, September 24, in his eighty-sixth year. He was formerly at the head of an asphalt paving company and it was under his direction that the first asphalt pavement was laid in Brooklyn. He leaves a widow and daughter.

HENRY J. VOGEL.

Henry J. Vogel, of the firm of William Vogel & Bro., manufacturers of sheet metal goods, of Brooklyn, N. Y., died on September 3d at his summer home, in Hempstead, of pneumonia. Mr. Vogel was born in the Eastern District, 59 years ago, and had always lived there. He had been forty-three years in business, and for sixteen years he had been superintendent of the Sunday school of St. John's M. E. Church, where he was much beloved. He had been vice-president of the Manufacturers Association, trustee of the Eastern District Hospital and active in all his relations. He leaves a widow, Emilie S., and two daughters, Gertrude, the wife of Henry Edwards, and Irma.

D. WILLIS JAMES.

D. Willis James, who was one of the best-known metal merchants of New York City, and who was also actively interested in educational and philanthropic work, died September 13th, at the Mount Washington Hotel, Bretton Woods, N. H., of heart disease. Mrs. James was with him at the time of his death. He was reputed to be worth not less than $40,000,000.

Daniel Willis James was born in Liverpool, England, where his father was a prominent merchant. The son became early interested in the manufacture and importation of metals, and soon made a large fortune. He had been in business in New York City more than a third of a century. At the time of his death he was the senior member of the firm of Phelps, Dodge & Co., of 99 John street.

In the financial and business world Mr. James was widely known and connected. Besides being the senior member of the metal manufacturing and importing company, he was President of the Golden Hill Corporation and Southwestern Investment Company, member of the New York Chamber of Commerce, Vice-President of the United States Trust Company, a Vice-President of the Northern Securities Company, and a Director in the Copper Queen Consolidated Mining Company, the Commercial Mining Company, the Ansonia Brass and Copper Company, the Ansonia Clock Company, the United Globe Mines, the Arizona, El Paso & Southwestern Railroad Company, the Detroit Copper Mining Company of Arizona, the First National Bank of New York, the Morristown Trust Company, and the Northern Pacific Company.

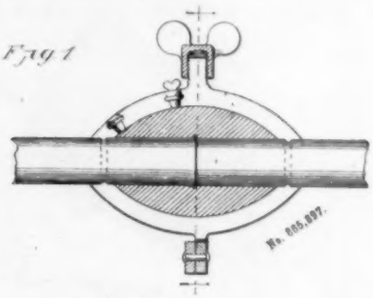
Mr. James was deeply interested in educational and philanthropic work. He was for years President of the Children's Aid Society. He was a member and a benefactor of the Metropolitan Museum of Art, and was interested by membership and otherwise in the American Geographical Association, the American Museum of Natural History, and the National Academy of Design.

Mr. James had long taken a deep interest in Amherst College, of which he was a trustee, and a large part of the special astronomical work having particular reference to the observation of eclipses of the sun with which Amherst has been identified, has been the result of his generosity. His business made him of necessity a student of metallurgy, but his interest was given also to various other branches of natural science.

REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

851,813. April 30, 1907. NEUTRAL SOLDERING FLUX. Oscar J. Lanigan, of Chicago, Ill., assignor to Garden City Laboratory, same place. This flux is intended for soldering the seams and caps of tin cans and the like. The flux is substantially inactive when first applied, but becomes active when the soldering iron is pressed upon the fluxed seam; in other words, when heated. The flux is made according to the following formula: 65 parts glycerine, 49 parts lactic acid and 14 parts 4 F ammonia. This flux, because it is neither acid nor alkaline, does not deleteriously affect canned food products.

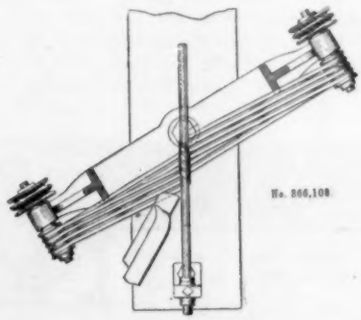
865,897. September 10, 1907. JOINT MOLD. Thomas Hogan, of Shreveport, La. This invention relates to improvements in joint molds for depositing metal around the approximate ends of pipes for the purpose of joining the same, and particularly



for the production of joints of that type known as "wiped" joints. This joint mold is simple, as may be seen from the engraving, and may be conveniently applied and removed. Provision is made for introducing the molten metal and forming a joint for connecting pipes which are horizontally or vertically placed or disposed at any angle. The mold is elliptical in form and consists of two similar half sections.

865,426. September 10, 1907. GRINDING APPARATUS. George E. Norris and George R. Shoemaker, of Columbus, O., assignors to the Columbus Aseptic Furniture Company. This invention relates to a new and useful improvement in universally mounted grinding wheels. The wheel is driven through a vertical shaft by means of beveled gears, one of which is placed upon the inner end of the shaft carrying the grinding wheel at its outer extremity. The bearing of this shaft is carried on a forked bracket which is free to slide upon the vertical shaft, the whole being counterweighted. The wheel shaft is provided with a universal joint so that the wheel can be brought to any desired position.

866,108. September 17, 1907. SPIRAL TUBE WINDING MACHINE. George H. Bartlett, San Francisco, Cal. This apparatus is intended for winding spiral tubing of any material which may be so wound and for any purpose for which such tubing may be employed. The machine is easily adjusted and automatic in



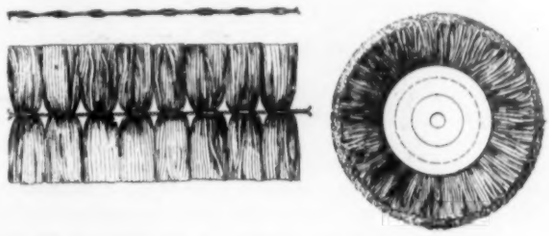
operation, and will form any size of tubing from ⅛ of an inch up. The material to be formed may consist of strip of the width required and the mandrel is of the correct size to produce tubing of the desired diameter. The pitch of the tubing can be changed as required.

865,857. September 10, 1907. MACHINE FOR PUNCHING. Samuel C. Bond, of Wilmington, Del. This invention relates to a machine for punching, which will supply the pressure to the punch plunger only in such amounts as will be required to remove the necessary amount of material from the article being punched.

865,071. September 3, 1907. MOLDING MACHINE. William H. Wood, Allegheny, Pa. This machine is designed particularly for making unusually deep molds and is of the power operated type. The two operating cylinders are arranged in line, one above the other. The flask is placed upon the ram of the lower cylinder and sand placed in it to partly fill it. The upper ram is then caused to descend into the flask and compress the sand. The upper plate is then raised and more sand put in and the compression repeated. After sufficient sand has been introduced and thoroughly compacted, the lower cylinder is operated to withdraw the pattern. By this means a mold of any desired depth can be formed.

864,727. August 27, 1907. FEED MECHANISM FOR TANDEM MILLS. George D. Evans, of Sharon, Pa., assignor to American Sheet & Tin Plate Company, of Pittsburg, Pa. It is the object of this invention to overcome the difficulty which has been experienced in feeding metal bars, plates, or sheets between successive sets of rolls arranged in tandem. This has been especially the case in rolling singles which are to be formed into sheets, as in the case of sheet bars. These bars are fed in sidewise and singly, and as they emerge from the one set of rolls their movement stops at a point so near the rolls that difficulty has been experienced in providing any practical form of feed mechanism for carrying them into the next set of rolls. This new device provides a throw-out which will act to move the metal forward a sufficient distance to allow the pusher dogs or positive feed or push mechanism to be brought into position back of the material and thus push it forward for the next set of rolls.

865,098. September 3, 1907. BUFFING AND POLISHING BRUSH. Edward N. Gaudron, assignor to William Dixon, both of Newark, N. J. The object of this invention is to make a buffing and polishing brush which can be manufactured in any width; and the invention consists of a buffing and polishing brush which comprises a grooved center piece provided with a central opening for being placed on a spindle, and one or more ring-

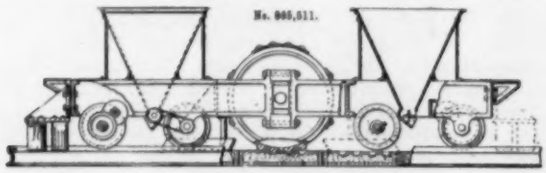


shaped buffing or polishing elements seated in the groove of the center piece and consisting of twisted and looped strands of wire and a plurality of tufts held in the loops of the strands. In this manner any width of brush can be made from a single circle of tufted elements to any number. Tufts of bristles or wires can be placed in the loops in the same manner as the tufts of cotton, so as to make polishing or scratch brushes, as desired.

864,325. August 27, 1907. CAN FORMING MACHINE. Charles B. McDonald, of Chicago, Ill., assignor to the McDonald Machine Company of the same place. This machine is intended to form bodies of cans from strips or blanks of tin and deliver them in seamed and soldered condition ready for the insertion of the heads. More particularly the invention relates to the mechanism for bending the edges of a blank preparatory to forming the seam, to the mechanism for bringing the hooked or bent edges into engagement with one another, and to the mechanism for finally pressing the interlocked edges tightly together to form the seam. These three steps are combined in such a manner that the successive operations will be quickly, accurately and perfectly performed.

861,263. July 30, 1907. CASTING MACHINE. Thomas H. Churchill, Toronto, Can. In this machine there are two separable groups of mold members and means for accurately maintaining the mold members of one group relatively to the mold members of the other group so that they will register in pairs when assembled. These mold members, when brought together in either a horizontal or perpendicular position, are revoluably held by an adjustable device.

865,511. September 10, 1907. MACHINE FOR MAKING FOUNDRY MOLDS. George P. Mehaffey, Knoxville, Tenn. This may be described as a rolling pattern device as a carriage carrying the patterns is arranged to pass over the beds or flask containing the sand and thus automatically form the molds in the sand. The device runs upon a track, the rails of which are far enough apart to make room for the flasks between them. At each side of the roller carrying the patterns is a hopper holding sand which is discharged along the path of the roller, either hopper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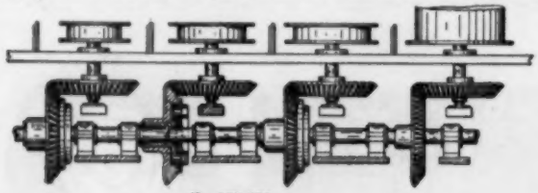
being available at will, according to the direction of movement of the apparatus. Between each hopper and the roller is means for striking or wiping the sand to a level and uniform surface. The apparatus also comprises mechanism for tempering the sand prior to the forming of the molds.

865,679. September 10, 1907. DRIVING MECHANISM FOR DRAWING-THROUGH DRUMS OF WIRE DRAWING MACHINES. Woodhouse Carter, of Victoria Mills, Low Moor, and Edwin Hodgson, of Cleckheaton, England. This invention has for its object the rotation of the drawing-through drums in continuous wire drawing machines, in such a manner that each drawing-through drum is driven at a speed corresponding to the reduction and elongation of the wire as it is drawn through the holes of the respective reducing plates, by driving gear so arranged that should the circumferential speed of any of the drums be retarded, the rotation of each of the successive drums will be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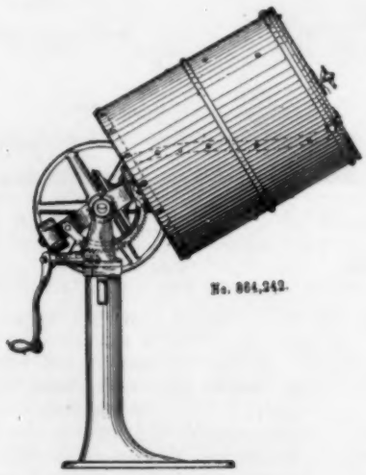
automatically and proportionately increased. By this means the retarded drum is assisted in drawing the wire through the plate and there is an equalization of tension, and there is no undue tension put upon the wire by any of the drawing-through drums, to such an extent as to endanger breakage of the wire on the removal of lubricant from the same by slipping around the drawing-through drum.

864,242. August 27, 1907. TUMBLING BARREL. Harry J. Guttman, of Chicago, Ill. This particularly relates to tumbling barrels of a size and character to be readily and easily adjusted by hand. Ordinarily barrels are operated by power, when the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size and capacity require it. This barrel is to be operated by belt power or other method and yet is so designed that it can be readily adjusted and properly positioned by hand. The barrel can be quickly opened or closed and can be inclined as may be necessary. The sides of the barrel are formed with spiral and internally arranged ribs which increase the tumbling action.

864,431. August 27, 1907. MOLDING MACHINE. August W. Rom, Chicago, Ill. This machine is particularly intended for making molds for circular castings, such as pulleys, wheels, and the like, and is especially adapted for making molds for casting grooved sheaves. The object is to provide a machine of this character which will accurately and rapidly form the grooved portion of the mold, so that much less labor will be required than in the ordinary methods of making such molds.

864,342. August 27, 1907. REEL FOR WIRE-COILING MACHINES. Gary B. Smith, of Minneapolis, Minn., assignor to the Smith Bedding Company of the same place. This invention relates to a reel or drum adapted to carry a coil of wire and from which the wire is uncoiled in the operation of the machine. The invention consists generally in regulating the frictional engagement or contact of the loose feed regulating ring with the follower.

TRADE NEWS

TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

Barlav Mfg. Co., Holyoke, Mass., have increased their capital stock from $75,000 to $100,000.

Consolidated Brass Foundry at Collegeville, Pa., has been bought and will soon resume operations.

The Rensselaer Valve Mfg. Co., Cohoes, N. Y., are contemplating the erection of a large new foundry.

The new nickel plating plant recently installed by the Weir Stove Co., Taunton, Mass., is now in operation.

C. W. Leavitt & Co., 220 Broadway, have had numerous orders of their magnesium deoxidizer and also their imported antimony.

The Republic Metalware Co., of Chicago, Ill., have purchased land at 1532 Wabash avenue, where they expect to construct a brick warehouse, 65x175.

The Albany Brass & Iron Co., of Albany, N. Y., have purchased the property at the corner of Dewitt street and Broadway, where they expect to locate later on.

The Partamol Co., 415 Broadway, New York, report a continued demand for their known parting compound and claim increased sales during the past three months.

The new building of the Loy-Nawrath Co., of 25 Runyon street, Newark, N. J., is nearly completed, and the firm expects to be occupying their enlarged factory within six weeks.

C. G. Hussey & Company, of Pittsburg, Pa., are installing ma-

chines for making all sizes of copper rivets and burrs. The company manufacture all kinds of copper and copper specialties.

W. J. Belyea & Co., Port Huron, Mich., will install a plating and polishing plant. The works will be located in a building in the rear of the German American Savings Bank on Pine street.

The United Brass Manufacturing Company, of Cleveland, O., are building an addition to their foundry of 55 by 100 feet. Six new furnaces will be added, the order for which has already been placed.

The Carriage Mountings Company, manufacturers of high grade automobile and carriage mountings and household nickel goods, are now located in their new buildings at Niagara Falls, Canada.

The Boston Woven Hose & Rubber Co., 170 Summer street, Boston, Mass., are building a new brass foundry at Portland street, near Burney. The building is of brick construction, one story high, 77x165.

Machine and circular brushes, also brushes adopted to chandelier manufacturers, silver and nickel platers, is the line of goods now manufactured by Herman Blumenthal, of 184 William street, New York.

The American Nickeloit & Manufacturing Company, Peru, Illinois, announce that they are always glad to give particulars about their basket anodes by the use of which either grain or scrap nickel can be used.

C. W. Leavitt & Co., 222 Broadway, New York, announce that buyers of composition or gun metal ingots should communicate with them as they are now selling agents for English manufacturers of composition metal.

The Seng Company, of 39 Dayton street, Chicago, Ill., manufacturers of hardware specialties for the furniture trade, expect to install a plating plant within the next 12 months and want to gather all the advance information possible.

S. M. Cohn, formerly proprietor of the Metropolitan Smelting & Refining Co., at 92 New Chambers street, New York, is now located at 101 Beekman street, and is doing a commission business, and acting as dealer in old and new metals.

Alexander Whiteside has been appointed receiver for the former firm of Goldberg & Rothman, 289 Commercial street, Boston, Mass. The firm's business was carried on by Alfred H. Rothman, who was petitioned into bankruptcy August 31st.

Dull times and the Geo. Zucker Co., of Newark, N. J., do not go hand in hand. This firm claims a very successful campaign with their famous "Acme" rouge composition. The trade at large seems to take to this polishing compound and keeps the manufacturers busy.

The Vulcan Copper Works Company, of East Front street, Cincinnati, O., have purchased the 5-story stone and brick building at 120-122 Sycamore street. Extensive improvements will be made in the building, which has a frontage of 60 feet by a depth of 100 feet, with an L-shaped structure in the rear.

The Hawley Down Draft Furnace Co., of Chicago and New York, manufacturers of the Schwartz metal melting furnace, report a most unique record for one week's shipping. In this short period they have sent furnaces to the following countries: Russia 2, Sweden 1, Japan 1, Australia 1 and Italy 1.

Alfred Fisher, manufacturer of a crucible oil melting furnace, 103 W. Monroe street, Chicago, Ill., is putting in six more furnaces in the A. H. Anderson plant of that city, making thirteen in all. Mr. Fisher reports that he believes that when it is finished the A. H. Anderson people will have the best plant in the West.

James N. Morehouse, a plater and gilder of 50 Lawrence street, Newark, N. J., has organized a company under the name of "Newark Brass Plate Engraving Co." with offices at 45-47 Lawrence street. This firm manufactures etched name plates, signs and dials. Geo. A. Boyd is also connected with the concern.

The Norwich Nickel & Brass Company, of Norwich, Conn., have finished plans for a $30,000 fireproof manufacturing plant. Work has already been started, and it is expected to have the plant completed by December 1. The building will be 181 feet long by 51 feet wide. Later an office building and large chimney will be constructed.

Zeh & Hahneman, of Newark, N. J., manufacturers of power presses and sheet metal working machinery, announce that they have recently bought the patents and rights for making power presses from Gould & Eberhardt, of the samec city. Zeh & Hahneman are doing a very heavy business, working hard to keep up with orders.

The Cincinnati Electrical Tool Co. announces the opening of a Western office and warehouse for the sale of their electric tools at 18th and Rockwell streets, Chicago, with Oscar P. Wodack as manager. Mr. Wodack has had a wide experience in handling electrical goods, and the success of this branch of a rapidly growing business is assured.

Buffalo, N. Y., despatches state that creditors of the Milne Manufacturing Company have filed a petition in bankruptcy against the company, and a receiver was appointed on the 25th ult. The Detroit Metal Spinning Company, the Bundy Recording Company of Syracuse, and the Warner-Swasey Company of Cleveland, are the petitioning creditors.

The Imperial Repair & Brazing Company, 329 West 12th street, New York City, has just added a jobbing brass foundry to its plant, which will be known as the Hudson Brass Company. Besides their work of brazing cast iron, steel, brass and copper, they are now in a position to make brass, bronze and aluminum castings of all kinds at short notice.

The Western Foundry Supply Company, whose headquarters were formerly at East St. Louis, Ill., have taken an office in the Phelps-Dodge Building, 99 John street, New York, which will henceforth be the headquarters of the company. They have works at East St. Louis, Ill.; Elizabethport, N. J., and Elkton, Va. Besides foundry supplies they sell manganese dioxide for the use of brass founders.

The Rockwell Engineering Co., 26 Cortland street, New York, report the most successful period of sales of their furnaces. The most important and recent sales have been: Union Iron Works, San Francisco, Cal.; Inter-Colonial Works, Moncton, New Brunswick, and The Western Tube Co., Kewanee, Ill. The latter firm ordered four furnaces, making the total now of 6 Rockwell furnaces in use in their plant.

O. J. Moussette, manufacturer of the "Monarch" crusher and pulverizer, of Brooklyn, N. Y., has recently gotten new orders for No. 1 and No. 2 crushers for foundry use. One machine went to the Capitol Brass Co., Detroit, Mich., and another to M. L. Oberdorfer Brass Co., of Syracuse, N. Y. Mr. Moussette has also built a small crusher for jewelers and sold one to the Dubois Watch Case Co., Brooklyn, N. Y.

The Russell & Erwin Manufacturing Company, for many years at 45-47 Chambers street, New York City, are erecting a large building at 94-98 Lafayette street. It will be of steel construction, brick and stone, and designed particularly to serve the purposes of the company. There will be 6 stories and a basement. All receiving and shipping will be at the Walker street entrance, leaving the Lafayette street front for the main entrance and window display.

Hans L. Green & Co. are the successors to Green & Shonberg, metal dealers of 110 Nassau street, New York City. Mr. Shonberg has severed his connection with the firm. Mr. Green has just returned from a business trip to Europe in which he obtained the agency for this country of the largest metal house

in Europe. The firm have increased their capital and will occupy larger offices in the same building, increasing the scope of their business in every way.

The Macungie Brass & Manufacturing Company, of Macungie, Pa., which was incorporated July 19, with capital stock of $25,000, has formed an organization by electing the following officers: E. E. Pryor, president; H. M. Singmaster, vice-president; H. E. Minker, treasurer, and J. W. Singmaster, secretary. The works are very busy, mostly turning out bibs and spigots. The company lately acquired the patents, patterns and 10 machines for making hose couplings, gas and air cocks, etc.

W. H. Bristol, 45 Vesey street, New York City, reports a very encouraging increase in the sale of his recording and indicating pyrometers. Mr. Bristol has received some large orders very recently, one being for 13 recorders for one firm and 12 recorders and 12 indicating instruments for another. The latter firm is to make use of a new idea using both instruments. They are to be used in combination, so that the operator can have the indicating pyrometer for regulating temperature and the superintendent have automatic records in his private office.

Springfield, Mass., has a new industry in the Millett Brass Company which, when well under way, will employ from 50 to 100 men. The company was recently organized to carry on a general brass foundry business and will operate in the Knox Automobile Company's large foundry in Waltham avenue. The company has arranged to have the use of a building 183 feet long by 50 feet wide. The company will make a specialty of high grade castings in aluminum, brass, bronze, composition and German silver. Eli Millett, the president of the company, is the well-known inventor of the Millett core oven, which is in daily use in foundries all over the world.

Announcement is made of the formation of the new Paige Retort & Crucible Company, of Taunton, Mass., incorporated in September with $25,000 capital. Among the stockholders are men of ample means who are ready to increase the capital stock as needed. The treasurer is Edwin D. Paige, of Taunton, who has had 19 years' experience in the manufacture of crucibles. The plant of the new company was bought last spring and special machinery with the latest electrical devices has been installed during the past Summer. The company will be ready to supply the market about the first of 1908, and both the crucibles and retorts will be of the highest quality. The company asks the founders to send to them for figures before placing their contracts for 1908.

FIRES

Baker Lead Mfg. Co., of Worcester, Mass., was burned Aug. 10. Loss estimated at $15,000.

The damage to the works of Wilcox, Crittenden & Company, Inc., of Middletown, Conn., on the morning of July 31 interfered in no way with the regular conduct of the business. The flames were confined solely to the buildings of their galvanizing and tinning rooms, forge department, power house and office, and no damage was done to the brass and iron foundries, or to the company's new main building containing the machine department, stock and shipping rooms. Business was continued without a day's interruption. The forge department was moved to a neighboring building, and as the works were equipped to run by electricity it was only necessary to connect with the street railway and obtain all the power required.

FINANCIAL

The daily press reports that "The United Metals Selling Company has declared and paid the usual quarterly dividend of $7.50 a share. The United Metals Selling Company has a capital stock of $5,500,000, and handles the output of the mines of Amalgamated Copper and many other companies. It is credited with handling more than 600,000,000 pounds of copper a year, or about two-thirds of the country's annual production."

INCORPORATIONS

The Holyoke Supply Company, of Holyoke, Mass., has been incorporated with a capital of $6,000 to manufacture plumbing supplies, etc., by Daniel F. Moriarty, president, and Louis D. Wright, treasurer and clerk.

The E. Tilman Company, of New York City, has been incorporated with a capital of $15,000 to manufacture brass goods. The directors are Ernest Tilmann and J. H. Lloyd, New York City, and Irvin Adler, Brooklyn, N. Y.

The American Brass Bed Company, of New York City, has been incorporated with a capital of $10,000. The directors are: Simon Clug and Rose Clug, of 79 West 115th street; S. A. Schneider, 6 East 118th street, New York.

The New York Metal Selling Company, of New York City, has been incorporated with a capital of $50,000 by Misha E. Applebaum, 420 Broadway; Hyman Sonn, 73rd street and Broadway, and Henry Sonn, 33 West 86th street.

The Amesbury Brass Foundry Company, of Amesbury, Mass., has been incorporated to do a general foundry business with a capital of $10,000. John Miller is the president and clerk, and Charles W. Putnam, the treasurer, both of Amesbury.

The Westchester Foundry Company, of New Rochelle, N. Y., has been incorporated to do a foundry business and manufacture tools, machinery, etc. The capital is $40,000. The incorporators are: W. J. Jacobson, F. J. Holler, H. Benstem and W. L. Morgan.

The Roanoke Stamping & Enameling Company has been organized at Roanoke, Va., with a capital of $50,000. The following officers have been elected: I. M. Warren, president and treasurer; L. B. Davis, secretary. The company will erect a plant at once.

The Camden Metal Company, of Camden, N. J., has been incorporated with a capital of $100,000, to conduct foundry for casting aluminum, lead, zinc, brass and bronze. The incorporators are: John S. Schwab, Horace L. Biener and William Schmid.

The Metal Corporation, 1 Exchange Place, Jersey City, N. J., has been incorporated with a capital of $125,000 to handle metals, compositions, metal bearings, bronzes, etc. The directors are: William H. Carey, John H. Petterson, Charles J. Gormley, all of 1 Exchange Place, Jersey City.

The Dowd Silver Company, of New York City, has been incorporated to manufacture gold and silverware, plated ware, etc. The capital is $20,000. The directors are John C. Dowd, 524 Broadway; Philip Pfannebecker, Mount Vernon, N. Y., and James H. Dowd, 524 Broadway, New York City.

The F. Alexander Electric & Manufacturing Company, of New York City, has been incorporated with a capital of $25,000 to manufacture gas and electric fixtures. The directors are: Louis Liebes, Hannah Liebes, 325 Amsterdam avenue, and F. Alexander, 128 East 23rd street, all of New York.

The Walnut Machine & Brass Company, of Toledo, O., has been incorporated with a capital of $10,000 by E. L. Rowe, E. G. Schuller, E. J. Vollmer, Amos McDonnell and Walter A. Antler. The new company will take over the plant of the Aluminum Brass Castings & Novelty Company, located on Walnut street.

The Highland Falls Manufacturing Company, of Highland Falls, N. Y., has been incorporated with a capital of $40,000, to manufacture and cut gearing of brass and other metals. The incorporators are: George W. Blanchard, Wesley Blanchard, William C. Whitney, Frank G. Watrous, all of Highland Falls, and Austin V. M. Sprague, 542 West 15th street, New York City.

The John C. Culbert Company, Pawtucket, R. I., announce that they have taken over the business formerly conducted by J. C. Culbert, of Pawtucket, R. I., and have incorporated under the laws of the State of Rhode Island with a capital stock of $100,000. The company's office and storehouse will continue to be at Waverly Place, on the line of the New York, New Haven and Hartford Railroad, where they have increased their facilities. The officers of the company are: John C. Culbert, president; J. Milton Payne, treasurer, and John W. Ramsbottom, secretary. Mr. Culbert will continue in the management, and his slogan will be the same as ever, viz.: "SPOT CASH" for metals, residues and silver sweeps.

PRINTED MATTER

Soldering Coppers. The Taunton-New Bedford Copper Company, of New Bedford, Mass., make a full line of soldering coppers in the regular sizes and shapes and in special shapes.

The Power Users' Creed is the title of a folder sent out by the B. F. Sturtevant Company, of Hyde Park, Mass. The user believes in heating the feed water by the waste gases from the boiler, thereby saving financially.

Porcelain Mounted in Sterling Silver. A folder by the Whiting Company, of Broadway and 19th street, New York City, pictures and describes some of their latest sets of fine porcelain mounted in sterling silver, for the serving of various beverages, with spoons to match, of appropriate shapes and sizes.

Smelters, Refiners and Dealers in Metals. The Hazard, Coates & Bennett Company, of Rochester, N. Y., have sent out their usual monthly calendar blotter. This time the scene is on a Southern cotton plantation. Mention is made of their brass and bronze compositions, and babbitt and anti-friction metals.

Riveters. The riveters built by the Hanna Engineering Works, 824 Elston avenue, Chicago, Ill., are designed for all riveting purposes. The construction is such that no adjustment is required for ordinary variations. These riveters are operated pneumatically and yet the construction is such that hydraulic effects are obtained.

"Twinvolute" Turbine Pumps. Catalogue No. 72, by the Watson-Stillman Company, of New York City, describes their turbine pumps which are practically noiseless in operation and can be operated automatically when used in connection with an electric motor; in the smaller sizes they are particularly desirable as house tank pumps.

Anti-Friction Babbitt Metal. The babbitt metal made by the Union Smelting & Refining Company, of 604 East 19th street, New York City, is sold under a three months' guarantee to prove satisfactory, otherwise the money is refunded. It is stated that the use of this metal will save 50 per cent. of the running expenses of a plant.

Portable Electric Hoists. A card from the Chicago Pneumatic Tool Company, Fischer Building, Chicago, Ill., describes their Duntley portable electric hoists, which are stated to be simple, sure and economical in operation. They are made in sizes from 250 to 2,000 pounds capacity, equipped with two armature motors, planetary systems of gearing, and are absolutely self-locking.

Pulley Molding Machinery. A recent catalogue by the E. A. Delano Company, of 150 East Huron street, Chicago, Ill., describes their very complete line of pulley molding and finishing machinery. The company have also issued a circular of their machinist's babbitt stove, which is adapted for use in the machine shop where babbitt, lead or other soft metal is cast. With this stove, by using hard coal, the metal can be kept melted and at the right heat all day without any attention.

Rolls, Blowers, Sand Blast, Etc. A folder issued by Leiman Brothers, of 141 Centre street, Newark, N. J., deals with their rolls, polishing benches provided with dust collector, draw benches, melting furnaces, ingot molds, drilling machines, sand blast, blowers, etc. In their sand blast apparatus the tubes are all short and straight, thereby preventing loss of energy. Their rolling mills are made in seven sizes, with power or hand power for plate, square, half-round, or pen rolls. Their melting furnaces are built in sizes for melting from 1 to 40 pounds of gold, copper, silver, brass, etc.

Electrical Measuring Instruments. A large catalogue has been received from the American Instrument Company, of 1114 Chestnut street, Philadelphia, Pa., concerning their electrical measuring instruments, including voltmeters, ammeters, shunts, etc. All the "American" voltmeters are adjusted to have a resistance of exactly 100 ohms per volt. That is, a 150-volt instrument has 15,000 ohms total resistance, 10-volt instrument has 1,000 ohms total resistance, and so on. The fact that the resistance of these voltmeters is an even multiple of 100 vastly facilitates their use.

Tobin Bronze is manufactured only by the Ansonia Brass & Copper Company, 99 John street, New York City, with factories at Ansonia, Conn. This bronze is a combination of copper with other metals. When rolled hot it is remarkable for its high elastic limit, tensile strength, hardness and uniform texture. Its tensile and transverse strength is the same as ordinary mild steel and it is adapted for a variety of purposes where a strong non-corrosive metal is required. When used in the form of rolled plates, bolts and rivets in contact with salt water it has given most favorable results.

Standard Soldering Flux is manufactured by the Marlou Chemical Works, of Warren and Bay streets, Jersey City, N. J. When this flux is used on capping machines it will keep the steels absolutely free from dross and it will never be necessary to shut down to clean them, as they will not need it. It is perfectly free from acid and is not even made from an acid base. The same quantity of solder will do more work, there will be fewer leaks and there will be no spoiled goods from flux. The company make flux for every conceivable purpose, and if you have trouble making your solder flow, or making joints tight, it would be well to write them.

Electric Furnaces. The electric furnaces made by the Hoskins Company, 93 East Erie street, Chicago, Ill., employ their resistance wire, which is made under patents granted this year and which is stated to be the only wire except platinum which will not burn at a temperature of 1000 C. This wire has six times the electric resistance of platinum wire and this permits the making of the furnaces without any rheostat. The heat, therefore, goes into the furnace and is not wasted heating the air. The furnace can be heated to a temperature of 2,012 F. or the melting point of gold. The furnaces can be operated on the 110 volt circuit, either alternating or direct, and can be attached to the usual lamp socket. This, their type No. 20, is a combination crucible and muffle furnace, the size of the chamber being 2⅛ by 2½. It only requires 3½ amperes at 110 volts.

Hand Hammered Bbass and Copper Novelties. A very handsome catalogue has been received from the Benedict Manufacturing Company, of East Syracuse, N. Y., dealing with their hand-wrought iron, brass and copper art work. This company purchased the Onondaga Metal Shops and have moved the same to East Syracuse where they have built a special factory for this work. Their line consists of hand wrought copper, brass and iron pieces such as lamps, chandeliers, electroliers, candlesticks, smoking sets, chafing dishes, wall placques, andirons, etc. The company also produce all kinds of architectural and decorative iron work, such as window gratings, fire place hoods, gateways and doors, hinges, escutcheons, etc. On their iron they produce a peculiar finish known in the old world as "armour bright" which offers a very pleasing effect. The objects in brass and copper are subjected to the process of firing which develops the colors, not obtainable by any other known method.

CATALOGUE BUREAU

THE METAL INDUSTRY has established a Catalogue Bureau by which it will prepare and do all the work necessary for the making of catalogues, pamphlets, circulars and other printed matter. Estimates will be furnished for writing the description, making engravings, printing, binding, in fact for the entire job from the beginning to the end or any part of it. Let us know your needs and we will tell you just exactly what we can do and what it will cost you. A catalogue should be a trade getter—that is the kind we produce. Write to the CATALOGUE BUREAU of THE METAL INDUSTRY, 61 Beekman street, New York.

ANALYZING AND TESTING BUREAU

THE METAL INDUSTRY is independent of all laboratories, but we offer our services in directing our readers where they can get metals, materials and supplies analyzed and tested to the best advantage. We have an intimate knowledge of the best laboratories in the country and know the specialties of the different ones. Cost for analysis or test furnished on receipt of sample.

OFFICE HEADQUARTERS

When visiting New York, the out-of-town friends of THE METAL INDUSTRY are invited to make our office their headquarters, where a writing desk and telephone service will be at their disposal. Every one interested in the non-ferrous metals and alloys is invited to call.

INFORMATION BUREAU

Subscribers intending to purchase metals, machinery and supplies and desiring the names of the various manufacturers and sellers of these products can obtain the desired information by writing to THE METAL INDUSTRY. Our Information Bureau is for the purpose of answering questions of all kinds. Send for circular.

METAL MARKET REVIEW

NEW YORK, October 7, 1907.

COPPER.—Standard Copper in London declined £10 during the month of August and a further £10 during September, and the price to-day of best selected copper is equivalent to 14 cents New York. This further decline makes a drop of £46 per ton since the high prices ruling in the early part of this year.

A month ago the copper market was around $17.50 to 18 cents per pound for Lake and Electrolytic Copper, the price having been cut 4 cents per pound during the month of August. To-day the price is around 14¼ to 14¾ cents for Lake and Electrolytic, and the market statistically is in no better shape than it was a month ago. Production is being cut down and heroic measures are being taken to stop any further decline, but the effect of these drastic measures cannot be felt for some months yet, and in the meanwhile the supplies of copper are more than the market can stand, and to-day at around 14 cents the market is weak and unsettled. The market to-day looks like 12½ cents and unless demand improves considerably present prices cannot hold. As long as the large producers and selling agents continue to sell in Europe cheaper than they will sell here the home consumers cannot possibly have any confidence in the market. Every cut in the price abroad is known here the same day it is made, so that this ostrich-like action of the leading sellers only leads to further demoralization and a general lack of confidence. At present the load of copper in the market is more than the present market can stand, and there are no indications of any quick relief, so that 12½ cents may be quite possible in a short space of time. The market to-day is weak and demoralized at from 14¼ to 14¾ cents for Lake and Electrolytic, with casting brands at around 14 cents. The exports of copper for the month were a little better, 17,157 tons, being nearly 4,000 tons better than August.

PIG TIN.—The London tin market has ruled fairly steady considering the many declines in copper. London tin declined about £6 per ton during the month, although statistics at the end of last month were decidedly bullish.

The New York market has followed, as usual, the London fluctuations, trading has been smaller, and consumption for the month of September is estimated at 2,800 tons, against 3,200 tons in August. Spot tin to-day, 5-10 ton lots is quoted at $34.70, futures at 10 to 15 points less.

LEAD.—The London market shows a net advance for the month of about £1 per ton, and prices abroad are getting closer to the export parity.

The New York market has ruled dull and easier on a general slack demand, and the lead trust is reported to be carrying quite a load of lead. Lead at 4½ cents in St. Louis is fairly cheap, but apparently does not interest consumers. New York prices, carload lots, $4. 70 to $4.75, while the trust price is $4.75, reduced from $5.25 on September 6 last.

SPELTER.—The London market has ruled around £21.

The New York market opened at around $5.60 New York and declined to about 5⅛ cents, when a reaction set in and prices rapidly advanced to $5.45 at the close. In St. Louis spelter sold down close to $4.90 and at the close is up to $5.30.

ANTIMONY.—The foreign market has turned firmer and prices to-day have advanced £8 per ton from the low prices lately ruling.

In the New York market stocks of antimony have been pretty well cleaned up and the market is firmer and in better shape. Cooksons is held at 11½ to 12 cents; Halletts, 10½ to 10¾, and Hungarian grade at 10¼ to 10½.

ALUMINUM.—This market is easier on decreased consumption, and prices 4 to 5 cents per pound lower. The market to-day is about 45 cents, against 50 cents lately asked.

SILVER.—This market has fluctuated very slightly during the month, ranging from 31d. to 31½d. and in New York from 67 to 67½ at the close.

SHEET METALS.—Sheet copper has been reduced 4 cents per pound to 20 cents base, against 24 cents a month ago. The manufacturers have placed sheet copper on 20 cents base price on account of the cut to 15 cents for copper. Copper wire is down to 16½ cents base—a drop of 4 cents. Seamless brass tubing has been reduced 2 cents per pound, and copper tubing 3 cents per pound. All the reductions are figured on a copper market of 15 cents per pound. Should copper continue to decline prices will have to be further reduced.

OLD METALS.—The market has been rather more active and consumers of copper scrap have been buyers of small lots for prompt delivery. The market is in better shape and the decline seems to have stopped.

THE SEPTEMBER MOVEMENT IN METALS.

	Highest.	Lowest.	Average.
COPPER—			
Lake	19.25	15.25	16.75
Electrolytic	18.12½	15.00	16.35
Casting	17.68	14.62½	15.93
TIN	36.65	35.45	36.89
LEAD	5.15	4.75	4.88
SPELTER	5.37½	4.55	4.66
ANTIMONY (Halletts)	10.75	9.12½	9.89

DAILY METAL PRICES

We have made arrangements with the New York Metal Exchange by which we can furnish our readers with the Official Daily Metal Market Reports of the Exchange and a year's subscription to THE METAL INDUSTRY for the sum of $10. The price of the Report alone is $10. Sample copies furnished for the asking. We can also furnish daily telegraphic reports of metal prices.

See Advertising Page 23 following for Trade Wants

Metal Prices, October 7, 1907

NEW METALS.

	Price per lb.
COPPER, PIG, BAR AND INGOT AND OLD COPPER.	
Duty Free. Manufactured 2½c. per lb.	
Lake, car load lots	15.00
Electrolytic, car load lots	14.75
Casting, car load lots	14.00
TIN—Duty Free.	
Straits of Malacca, car load lots	34.75
LEAD—Duty Pigs, Bars and Old 2⅛c. per lb. pipe and sheets 2½c. per lb.	
Pig lead, car load lots	4.75
SPELTER—Duty 1½c. per lb.	
Western, car load lots	5.60
ALUMINUM—Duty Crude, 8c. per lb. Plates, sheets, bars and rods 13c. per lb.	
Small lots.....Nominal	47.00
100 lb. lots..... "	46.00
Ton lots..... "	45.00
ANTIMONY—Duty ¾c. per lb.	
Cookson's, cask lots, nominal	12.00
Halletts, cask lots	10.75
Other, cask lots	10.25
NICKEL—Duty 6c. per lb.	
Shot, Plaquettes, Ingots, Blocks, according to quantity	45 to .60
MANGANESE—Duty 20%	.80
MAGNESIUM—Duty Free	$1.50
BISMUTH—Duty Free	1.80
CADMIUM—Duty Free	1.55 to 1.60

	Price per oz.
GOLD—Duty Free	$20.67
SILVER—Duty Free	.67½
PLATINUM—Duty Free	28.00
QUICKSILVER—Duty 7c. per lb. Price per flask	42.00

OLD METALS.

	Price per lb.	
Heavy Cut Copper	12.50	13.00
Copper Wire	12.00	12.50
Light Copper	11.00	11.50
Heavy Mach. Comp.	11.00	11.50
Heavy Brass	8.50	9.00
Light Brass	6.00	7.00
No. 1 Yellow Brass Turnings	7.00	7.50
No. 1 Comp. Turnings	9.00	9.50
Heavy Lead	3.75	4.25
Zinc Scrap	4.00	4.25
Scrap Aluminum, sheet, pure	25.00	27.00
Scrap Aluminum, cast, alloyed	19.00	25.00
Scrap Aluminum, turnings	8.00	11.00
Old Nickel, solid	22.00	26.00
No. 1 Pewter	25.00	26.00

INGOT METALS.

	Price per lb.
SILICON COPPER, according to quantity	32 to 36
PHOSPHOR COPPER, 5%	22 to 24
Phosphor Tin	42 to 44
Brass Ingot, Yellow	12 to 14
Brass Ingot, Red	16 to 18
Bronze Ingot	15 to 17
Manganese Bronze	18 to 20
Phosphor Bronze	19 to 23

ZINC—Duty, sheet, 2c. per lb.	Price per lb.
600 lb. casks	7.50
Open casks	8.00

PHOSPHORUS—Duty 18c. per lb.	
According to quantity	35 to 45

PRICES OF SHEET COPPER.

SIZES OF SHEETS.		96oz. & over 75 lb. sheet 30x60 and heavier	64oz. to 96oz. 50 to 75 lb. sheet 30x60	32oz. to 64oz. 25 to 50 lb. sheet 30x60	24oz. to 32oz. 18¾ to 25 lb. sheet 30x60	16oz. to 24oz. 12½ to 18¾ lb. sheet 30x60	14oz. and 15oz. 11 to 12½ lb. sheet 30x60
		CENTS PER POUND.					
Not wider than 30 ins.	Not longer than 72 ins.	20	20	20	20	20	21
	Longer than 72 ins. Not longer than 96 ins.	20	20	20	20	20	21
	Longer than 96 ins.	20	20	20	20	20	22
Wider than 30 ins. but not wider than 36 ins.	Not longer than 72 ins.	20	20	20	20	20	22
	Longer than 72 ins. Not longer than 96 ins.	20	20	20	20	20	22
	Longer than 96 ins. Not longer than 120 ins.	20	20	20	20	21	23
	Longer than 120 ins.	20	20	20	21	22	
Wider than 36 ins. but not wider than 48 ins.	Not longer than 72 ins.	20	20	20	21	22	24
	Longer than 72 ins. Not longer than 96 ins.	20	20	20	21	23	25
	Longer than 96 ins. Not longer than 120 ins.	20	20	20	22	24	28
	Longer than 120 ins.	20	20	21	23	26	
Wider than 48 ins. but not wider than 60 ins.	Not longer than 72 ins.	20	20	20	21	23	26
	Longer than 72 ins. Not longer than 96 ins.	20	20	20	22	24	29
	Longer than 96 ins. Not longer than 120 ins.	20	20	21	23	26	
	Longer than 120 ins.	21	21	22	24	28	
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 ins.	20	20	21	23	28	
	Longer than 96 ins. Not longer than 120 ins.	20	20	22	25	30	
	Longer than 120 ins.	21	21	23	28		
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 ins.	21	21	23	26		
	Longer than 96 ins. Not longer than 120 ins.	22	22	24	27		
	Longer than 120 ins.	23	23	25	29		
Wider than 108 ins.	Not longer than 132 ins.	24	24	26			
	Longer than 132 ins.	25	25	28			

Rolled Round Copper, ⅜ inch diameter or over, 20 cents per pound. (Cold Drawn, Square and Special Shapes, extra.)

Circles, Segments and Pattern Sheets three (3) cents per pound advance over prices of Sheet Copper required to cut them from.

All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.

All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.

Cold Rolled and Annealed Copper, Sheets and Circles, take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.

Planished Copper, one (1) cent per pound more than Polished Copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

Tinning Sheets, on one side, 3½c. per square foot.

For tinning both sides, double the above price.

For tinning the edge of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

Metal Prices, October 7, 1907

Net Cash Prices.

COPPER BOTTOMS, PITS AND FLATS.

14 oz. to square foot and heavier, per lb.	24c.
12 oz. and up to 14 oz. to square foot, per lb.	25c.
10 oz. and up to 12 oz.	27c.
Lighter than 10 oz.	30c.

Circles less than 8 in. dia., 2c. per lb. additional.
Circles over 13 in. dia. are not classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1c. per lb. extra.

PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

In effect September 30th, 1907, and until further notice.

To customers who purchase less than 5,000 lbs. per month and over 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.15¼	$0.17⅝	$0.19⅛
Wire ¼" and larger	.15½	.17⅞	.19¾
Wire smaller than ¼" to No. 8, inclusive	.16¼	.18⅝	.20⅛
Wire smaller than No. 8 to No. 10, inclusive	.16¾	.19⅛	.21
Rods ¼" and larger to ½" diameter	.15⅝	.18⅛	.21
Rods ½" to 1" diameter, both inclusive	.15½	.17⅞	.20¾
Brazed brass tubing	.21⅝	—	—
Brazed bronze and copper tubing	—	—	.24½
Open seam brass tubing	.19⅝	—	—
Open seam bronze tubing	—	—	.22½
Brass angle and channel	.21¾	—	—
Bronze angle and channel	—	—	.25⅝

15 per cent. discount from all extras except for quality.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass	1¼c. per lb. net advance.
" —Best spring, drawing and spinning brass	2¼c. " " " "
" —Rich low brass	⅝c. " " " "
Wire—Extra spring and brazing brass wire	1¼c. " " " "
" —Best spring and brazing brass wire	2¼c. " " " "
" —Rich low brass wire	⅝c. " " " "

To customers who purchase less than 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.16¼	$0.18⅝	$0.20⅛
Wire ¼" and larger	.16⅝	.18⅞	.20¾
Wire smaller than ¼" to No. 8, inclusive	.17¼	.19⅛	.21½
Wire smaller than No. 8 to No. 10, inclusive	.17¾	.20⅛	.22
Rods ¼" and larger to ½" diameter	.16¾	.19⅛	.22
Rods ½" to 1" diameter, both inclusive	.16½	.18⅞	.21⅝
Brazed brass tubing	.22¾	—	—
Brazed bronze and copper tubing	—	—	.25½
Open seam brass tubing	.20⅜	—	—
Open seam bronze tubing	—	—	.23½
Brass angle and channel	.22¾	—	—
Bronze angle and channel	—	—	.26¾

5 per cent discount from all extras except for quality.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass	2¼c. per lb. net advance.
" —Best spring, drawing and spinning brass	3½c. " " " "
" —Rich low brass	1⅝c. " " " "
Wire—Extra spring and brazing brass wire	2¼c. " " " "
" —Best spring and brazing brass wire	3¼c. " " " "
" —Rich low brass	1¾c. " " " "

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ in. O. D. Nos. 4 to 13 Stubs Gauge, 20c. per lb.
Seamless Copper Tubing, 23c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe Size.	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb.	28	27	23	21	20	20	20	20	20	20	20	21	22	24	26	27

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 Feet. Brass.	Bronze.
⅜ inch	$8.00	$9.00
½ inch	8.00	9.00
⅝ inch	10.00	11.00
¾ inch	12.00	13.00
⅞ inch	14.00	15.00
1 inch	18.00	20.00
1¼ inch	22.00	24.00
1½ inch	25.00	27.00
1¾ inch	32.00	35.00
1⅞ inch	45.00	48.00
2 inch	56.00	60.00

Discount 45 per cent.

PRICES FOR MUNTZ METAL AND TOBIN BRONZE.

Muntz or Yellow Metal Sheathing (14" x 48")	16c. lb. net base.
" " " Rectangular Sheets other than Sheathing	18c. " " "
" " " Rod	17c. " " "
Tobin Bronze Rod	18c. " " "

Above are for 100 lbs. or more in one order.

PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

Not over 18 in. in width, not thinner than 23 B. S. Gauge, 4c. above price of pig tin in same quality.

Not over 35 in. in width, not thinner than 22 B. S. Gauge, 5c. above price of pig tin.

PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

	Wider than ..... 3in. 6in. 14in. 16in. 18in. 20in. 24in. 30in. 36in. and including.. 12in. 14in. 16in. 18in. 20in. 24in. 30in. 36in. 40in. in coils.								
No. 13 and heavier	47	47	49	49	49	49	52	52	52
" 14	47	47	49	49	49	49	52	52	52
" 15	47	47	49	49	49	49	52	52	52
" 16	47	47	49	49	49	49	52	52	52
" 17	47	47	49	49	49	49	52	52	52
" 18	47	47	49	49	49	49	52	52	55
" 19	47	47	49	49	49	49	52	53	56
" 20	47	49	49	49	49	51	54	55	57
" 21	47	51	51	51	51	53	56	57	63
" 22	47	51	51	51	53	55	56	60	64
" 23	47	51	51	51	53	53	56	62	65
" 24	47	51	53	55	55	55	58	64	67
" 25	49	52	54	56	56	56	59	66	70
" 26	49	52	55	59	59	59	64	68	74
" 27	49	53	57	61	61	62	67	71	77
" 28	49	53	59	61	62	62	69	75	80
" 29	51	54	61	63	65	65	74	80	85
" 30	51	55	63	65	69	75	82	85	90
" 31	56	60	68	71	76	84	87	90	96
" 32	58	62	70	74	82	90	97	103	108
" 33	60	64	73	78	86	97	104	113	123
" 34	63	68	75	83	91	104	116	123	133
" 35	..	78	83	93	103	113	128	138	..
" 36	..	93	103	113	128	133	148	..	..
" 37	..	117	121	142	157	172	187	..	..
" 38	..	137	152	167	182	197	217	..	..
" 39	..	157	177	197	217	237	..	..	..
" 40	..	187	217	237	257	..	..	..	..

Extras are now charged over list prices whatever that may be on the day of order. Extra charges for cutting to length and polishing and satin finishing.

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are for 50 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

PRICE LIST OF SEAMLESS ALUMINUM TUBING—STUBS' GAUGE.

Stubs' G.	¼"	⅜"	½"	⅝"	¾"	1"	1½"	2"	2½"	2¾"
4 to 11	..	..	96	86	83	77	67	61	61	61
12	..	1.08	96	86	83	77	67	61	61	61
13	..	1.08	96	86	83	77	67	64	64	64
14	..	1.08	96	86	83	77	67	64	64	64
15	..	1.12	96	89	86	80	70	67	67	67
16	..	1.15	99	93	89	83	70	70	70	70
17	..	1.18	1.02	96	93	86	73	73	73	73
18	1.85	1.24	1.05	99	93	86	77	77	77	80
19	1.88	1.28	1.08	1.02	99	93	83	80	80	83
20	1.95	1.31	1.15	1.08	1.05	99	89	86	86	86
21	2.01	1.37	1.21	1.15	1.12	1.05	99	93	93	96
22	2.17	1.44	1.24	1.18	1.15	1.08	1.05	99	1.05	1.05
23	2.33	1.50	1.31	1.24	1.21	1.15	1.15	1.08	1.15	1.15
24	2.48	1.60	1.37	1.31	1.28	1.18	1.21	1.21	1.24	..
25	2.65	1.69	1.47	1.37	1.34	1.28	1.34	..	..	..

Prices are for lots of 50 lbs. Boxing extra. Smaller, larger and intermediate sizes furnished by manufacturers.

PRICE LIST FOR ALUMINUM ROD AND WIRE—B. & S. GAUGE.

Diameter B. & S. G'ge	000 to No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21	No. 22.
Price, per lb.	43	43½	43½	44	44½	45	45½	46	47	48	49	52	57

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12	$0.52	16	$0.58
13	.53	17	.59
14	.54	18	.60
15	.55		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 45 per cent.

GERMAN SILVER TUBING.

4	per cent.	to No.	19,	B. & S.	Gauge,	inclusive	$0.60
6	"	"	19,	"	"	"	.70
9	"	"	19,	"	"	"	.85
12	"	"	19,	"	"	"	1.00
15	"	"	19,	"	"	"	1.15
16	"	"	19,	"	"	"	1.20
18	"	"	19,	"	"	"	1.30

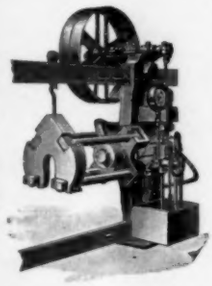
German Silver Tubing thinner than No. 19 B. & S. Gauge add same advances as for Brazed Brass Tube.

For cutting to special lengths add same advances as for Brazed Brass Tube. Discount 35 per cent.

PRICE OF SHEET SILVER.

Roller sterling silver .925 fine is sold according to gauge quantity and market conditions. No fixed quotations can be given as prices range from 2c. below to 6c. above the price of bullion.

Rolled silver anodes .999 fine are quoted at 2c. above the price of bullion.



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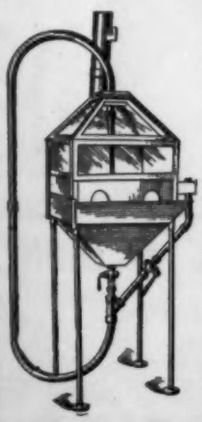

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BLOWPIPE SOLDERING, MELTING, SAND BLASTING, ANNEALING, OR WHEREVER A BLAST OF AIR IS REQUIRED AT PRESSURE.

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Two size machines, No. 1 and No. 2, will take Barrels of all kinds up to 36 in. diameter.

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BAIRD TUMBLERS

are quick and easy to operate, built STRONG to withstand rough usage and will run in either position shown in cuts or at any intermediate elevation.

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The kind you admire on the imported Cigarette Cases, Match Safes, Lockets, etc.

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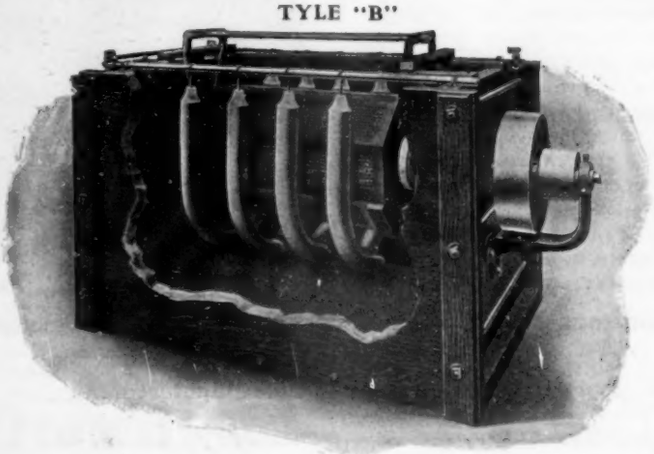
Mechanical Electro-Plating Apparatus

TYLE "B"



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The most efficient plating apparatus in the market. Over 500 in use by the trade

We will finish sample lots of work without charge.

This apparatus is a proved money saver where small work is to be plated. Can be used in Nickel, Copper, Brass, Zinc and Silver Solutions.

No Stringing. No Wire Used. No Metal Plating Trays or Baskets. No Unstringing. No Loss of Metal.

Capacity: 50 lbs. to 500 lbs., according to size.

Basket can be removed at will—without interfering with drive. In larger sizes basket is raised and lowered automatically.

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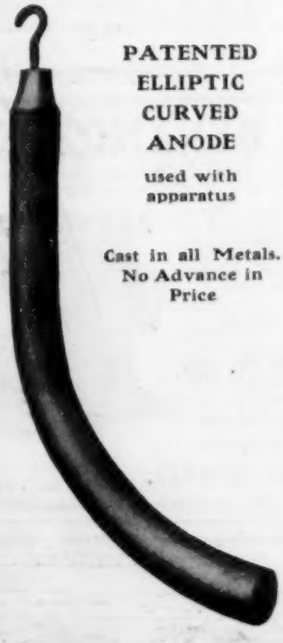

PATENTED ELLIPTIC CURVED ANODE used with apparatus

Cast in all Metals. No Advance in Price

Apparatus is Used for Electro-Galvanizing Small Articles

WE CAN FURNISH A LIST OF OVER 200 USERS OF THIS APPARATUS. MANY OF THE LARGER FIRMS ARE USING TEN OR MORE

WE HAVE MANY TESTIMONIALS INDICATING A LARGE SAVING THROUGH THE USE OF THIS APPARATUS IN PLATING SMALL WORK

Testimonial:

"The plating apparatus we have installed has proven a happy acquisition to our plating room. We send you this order for two additional apparatus."

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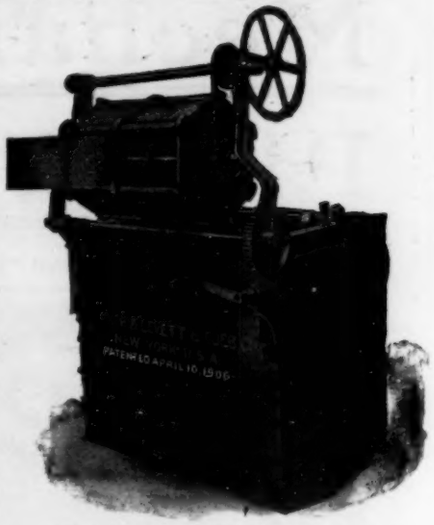
Plating and Finishing at One Operation in Nickel, Copper, Zinc, Brass or Bronze.

All sorts of small work, such as nuts, bolts, screws, etc., can be economically and quickly Plated and Finished at one operation, labor of stringing also being done away with. The apparatus is fitted with a Crank and Gear by which the cylinder can be raised out of the solution to receive or discharge work. We make for this apparatus special curved anodes so that the anode surface is at all points equidistant from the work.



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Not an ounce of Metal wasted or sold for scrap.

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1907 Model

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A Plating Dynamo and Power Motor **combined in one,** self-operated by any **Direct Current** Light or Power Circuit. **(No motor, belts or pulleys required), Fully warranted. For Gold, Silver, Nickel and Copper Plating, etc.**

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Mfrs. of Electric Lathe Motors, Plating Dynamos and Plating Dynamotors

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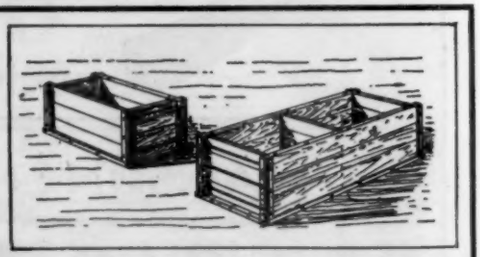

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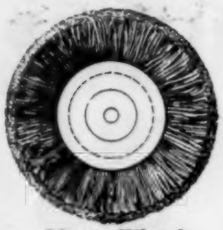

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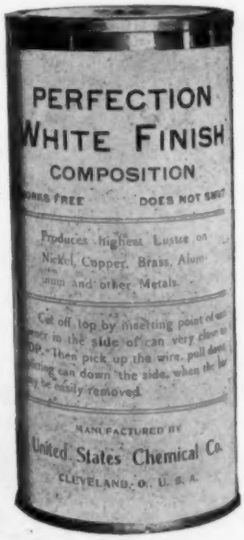

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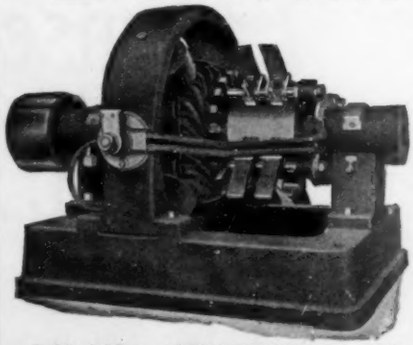

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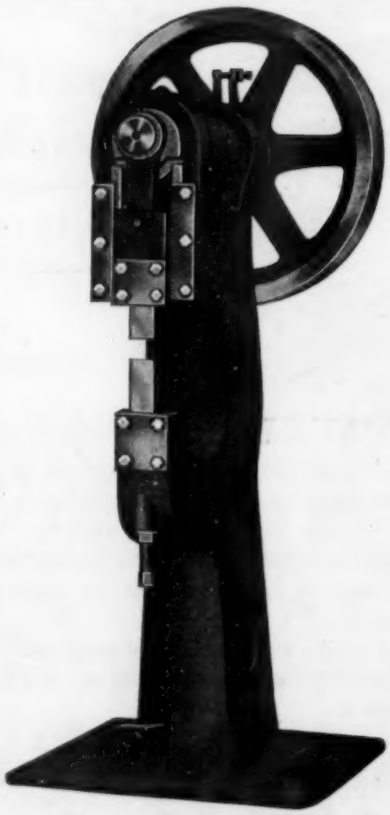

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It is easily operated. Simply hold the foot treadle down till the work is finished.

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Prepared and shipped in cakes that just fit the hand. Its use gives a fine finish to nickel plated work and fine brass castings where a higher color is required. It is especially invaluable for use on castings having embossed parts or deep backgrounds. The particles left in the interstices are easily washed out. It is sometimes called "White Rouge." It is put up in brick form and offered at a low figure.

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